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ABSTRACT

The primary objective of this project was to design a system to provide information services that would fulfill the information requirements of federal planners, instructional material developers, training program directors and instructors, students, interns, employers, and practitioners concerned with problems relating to personnel and training for educational research, development, diffusion and evaluation (RDD&E). Chapter I of the report outlines the project and summarizes previous reports on the planning and preliminary design phases. Chapter II provides a description of the target audiences and an analysis of their requirements. Chapter III describes the pilot field test of 14 dissemination alternatives; presents the results; and makes recommendations, with cost estimates and rationale, for each promising alternative. Chapter IV provides insight into the perceptions of representatives from each of the five key target groups about priorities for serving each of 16 subclasses of potential information users. Chapter V analyzes the amount of information and instructional resources existing in several RDD&E content categories. Chapter VI deals with selecting the best and most useful items for acquisition and dissemination. The last chapter summarizes the data graphically and presents the conclusions of the study. (Related documents are SP 007 655, 007 656, 007 658, and 007 659.) (DDO)

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FINAL REPORT

Project No. R029047
Contract No. OEC-0-72-5310

DESIGN OF A PERSONNEL AND TRAINING INFORMATION SYSTEM FOR EDUCATIONAL R&D PERSONNEL

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PREFACE AND ACKNOWLEDGEMENTS

This is the final report of a design project that investigated ways to improve communication among those concerned with personnel and training for educational research, development, diffusion and evaluation (RDD&E). This report provides a summary of several interim reports, which must be consulted if the reader wants a more detailed treatment.

Nancy McCutchan assumed major responsibilities including selecting and introducing items into the pilot test information system, supervising abstractors, preparing mock-ups and prototypes of various information products and services, conducting user studies, collecting pilot test data and preparing several reports. Carol Burkhart, the project administrative assistant, was responsible for maintaining the experimental collection, preparing bibliographic records, and supervising typing and production of all project products and reports. Charles Aldrich performed literature reviews and made field visits to secure information pertinent to acquisition, selection, indexing, storage and retrieval of information. Nancy McCutchan, Karen Sussell, and John Berger have served as project editors.

We gratefully acknowledge the conceptual and practical contributions of our consultants: James Dunn, Sanford Glovinsky, Frank Mattas, William Paisley, Daniel Stufflebeam, and William Wolf. The list of persons at NIE and in the field who provided information, critiqued report drafts, or participated in field tests is a long one. Without naming each person here, we want to acknowledge their contribution. Susan Klein, the NIE project officer, has provided continuing assistance by reacting to plans and reports, locating resources, securing information, and scheduling interviews with NIE staff.

This project was committed to determining what kinds of information content, products and services users most wanted and needed. We have been pleased and surprised with the cooperation which these users gave. We thank them all for helping us accomplish our mission.

Paul D. Hood

EXECUTIVE SUMMARY

How can the National Institute of Education (NIE) provide or enhance access to personnel and training information and instructional resources that would improve the quality, competence, and utilization of the personnel needed for educational research, development, diffusion, and evaluation (RDD&E)? This basic question, raised by the NIE Task Force on Researcher Training, resulted in the commissioning of this project. Initially, NIE viewed the project as an inquiry into the feasibility of establishing an information and instructional materials center for educational RDD&E personnel and training. Such a center might serve a variety of target audiences, including sponsors, R&D training performers, trainers, students, employers, and educational practitioners. As the project progressed, however, it was determined, not only as a result of information developed by the project, but also in response to NIE priorities, that immediate establishment of an information center would not be required. Resources which had been reserved for advanced design work on the center and for preparation of its implementation guidelines were then redirected to several other specific problems. Although the project focus remained on "personnel and training," our findings have broader implications for the problem of R&D communication and technology transfer within the entire field of educational RDD&E.

The project was a very modest one, involving less than one-and-a-half men years of professional effort. The field test samples are small, but representative of the selected target audiences. Because selected alternative information services and prototype information products were actually provided to test users, who were interviewed individually after using or examining them, the reported user reactions are to tangibles rather than abstractions. The field test results are also set in the context of a much broader analysis of what is known or can be inferred about user requirements, needs for information, estimated quantities of available literature and instructional materials in different RDD&E content areas, etc.

Chapter I outlines the project and summarizes previous reports on the planning and the preliminary design phases. Chapter II provides a description of the target audiences and an analysis of their requirements. Chapter III describes the pilot field test of 14 dissemination alternatives, presents the results, and makes recommendations, with cost estimates and rationale, for each promising alternative. Chapter IV provides insight into the perceptions of representatives from the five key target groups about priorities for serving each of 16 subclasses of potential information users.

Chapter V turns from the examination of users and their requirements to the analysis of how much information and instructional resources exist in several RDD&E content categories. Relative and absolute estimates of quantities are presented. Chapter VI deals with a derivative problem: how can one select the "best" or, more importantly, the most "useful" set of items for acquisition or dissemination? This chapter, which focuses especially on the evaluation of instructional materials, also contains an analysis of the decision problem and provides general recommendations for selection and evaluation. Chapter VII graphically summarizes the data presented in previous chapters. In addition, it presents a brief conclusion which attempts to relate the study to a more general set of problems regarding NIE options for fostering communication within the "problem-oriented" R&D network.

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I. INTRODUCTION

A. Objectives

The primary objective of this project was to design a system to provide information services that would fulfill the information requirements of federal planners, instructional materials developers, training program directors and instructors, students, interns, employers, and practitioners concerned with problems relating to personnel and training for educational research, development, diffusion, and evaluation (RDD&E).

Initially the National Institute of Education (NIE) viewed the project as an inquiry into the feasibility of starting an information center for educational RDD&E personnel and training information and instructional resources. Four phases were projected: (1) a planning phase (July 1-August 31, 1972), (2) a preliminary design phase (September 1-November 30, 1972), (3) an advance design phase (December 1, 1972-January 31, 1973), and (4) a final report phase (February 1-February 28, 1973). The eventual establishment of such an information center was a conceivable outcome of the project.

During the progress of the project, partly as a result of information developed by the project, but also in response to NIE recommendations and federal policy toward support of training, we recognized that the immediate establishment of an information center would not be required. Consequently the experimental pilot tests, initiated during the preliminary design phase, were extended into December 1972 and January 1973, and the resources allocated for the last two phases were redirected toward providing NIE Researcher Training Task Force staff with information bearing more directly on instructional resources. The information included recommendations for evaluation and estimates of quantities of instructional materials in different content categories. Specific recommendations for inexpensive dissemination alternatives were also made. Finally, recommendations that might help NIE to establish a "core" RDD&E information collection were also submitted.

B. List of Accomplishments

The project has achieved the following:

1. Assessed user needs, including sponsors, researchers, developers, and trainers, and provided priority listings of user groups, and information content categories.
2. Created an experimental collection of over 1,000 items of literature and other materials representative of the types of information to be handled by the proposed system.
3. Selected, indexed, abstracted, and classified over 200 items to be used in pilot testing dissemination alternatives.
4. Examined alternatives for acquiring, evaluating, indexing, storing and retrieving information and materials.
5. Examined alternative procedures for disseminating information to various types of users.
6. Experimentally pilot tested a total of fourteen different activities and media for information dissemination.
7. Through a series of meetings and progress reports, involved National Institute of Education (NIE) staff, project technical consultants, and representatives of user groups in selection and evaluation of design alternatives.
8. Prepared a set of recommended promising alternatives for dissemination and developed a justification and a cost estimate for each alternative.

9. Investigated in depth the problems of evaluating instructional materials.
10. Prepared recommended lists of periodicals, references, and books for the creation of a "core" collection in educational RDD&E training.
11. Submitted five interim reports, this final report, and copies of all test products.

In the following sections, the activities and reports of the project are summarized.

C. Summary of Planning Phase Report

Introduction

The specific intent of the Planning Phase Report was to provide a basis for continuing dialogue between project staff and NIE sponsors, as well as representatives of user groups.

Since policy problems encountered during the planning effort impinged on larger issues of development and utilization of RDD&E talent, scientific and technical communication, dissemination and utilization of research and development (R&D) products, allocation of R&D resources, and economic justification for R&D investment, this report also provides useful perspectives on problems faced by nearly all of the NIE task forces.

Summary of the Report

The report consists of four main chapters and supportive appendices.

1. Chapter I: Introduction and Overview

This chapter lists project objectives; outlines the phases of the project; provides background information on the Research Training Program; summarizes the information needs of, and benefits for, the target audiences who might be served by a personnel and training information system; outlines the design requirements and approach; and discusses the relevance of the project to NIE plans and programs.

2. Chapter II: Definition of the Problem

Chapter II may hold the greatest interest for NIE planners. There is an initial discussion of the "problem space" in terms of ten systems which affect the transfer of scientific knowledge. The concepts of horizontal and vertical flow of knowledge are introduced within the contexts of the educational R&D, the personnel and training, and the practice improvement networks.

A second section provides perspective on the context for, and emergent goals of, the Research Training Program, as well as on NIE's dissemination and utilization program (including ERIC).

A third section reviews the resources and constraints which may be significant. It includes discussions of legal, NIE policy, other federal policy, financial, copyright, forms clearance, printing and binding, and other contract constraints. The potential resources discussed are nonfiscal, including the cultural system, political systems, membership groups and reference groups, invisible colleges, formal organizations, formal information systems, and federal and NIE policy.

The chapter concludes with an examination, and request for careful reader review, of the following proposed design concepts, which may markedly bias the design effort: commitment to a systems approach, user orientation, compatibility with other NIE information systems, economy, functional emphasis, design for flexibility and improvement, and the need for experimentation and evaluation. The anticipated outcome is an information system which will have these characteristics:

°it will actively acquire important personnel and training data and information;

°it will select, evaluate, synthesize, and reformulate personnel and training information, tailoring it to the requirements of priority target groups to facilitate the vertical knowledge flow;

°it will actively disseminate information to those who may need it;

°it will arrange for, and possibly support awareness of and access to, validated methodology, models, and instructional materials; and

°it will stimulate the formation and support the maintenance of invisible colleges among members of key target groups.

3. Chapter III: Analysis of User Requirements

The users of the proposed information system are identified as a composite of six different groups of RDD&E personnel types: (1) sponsors, (2) performers, (3) trainers, (4) students/interns, (5) employers, and (6) practitioners. A description and an estimate of the size of each group, as well as its subgroups, are included. A subsequent section reviews each group's personnel and training information needs. A discussion follows on the use of information sources and the problems users may encounter in searching sources for relevant information on educational RDD&E personnel and training. This chapter concludes with a note on the distinction between information need and information demand which, in turn, points to the need not only for policy analysis, but also for studies of user's articulated demands or desires for information.

4. Chapter IV: Preliminary Analysis of Alternatives

This chapter introduces the information systems concepts of information (content) flow, functions, and nodes (originators, processors, and users).

The concept of information flow is analyzed first, in terms of information structure, level of formalization, and content. The implications of these components for analysis and classification of the information flow of educational RDD&E content in general, and personnel and training content in particular, are examined.

The explanation of information system functions consists of brief descriptions of the following: acquisition; screening and evaluation; surrogation; announcement and dissemination; index operations; document and materials management and delivery; reference and special services; policy formation, management, and administration; system evaluation; modification and improvement; and resource procurement.

The concept of information system nodes and the three roles of originator, processor, and user are then briefly introduced.

This presentation of the conceptual framework is succeeded by a discussion of the problem of information synthesis. Two important distinctions between the library and the information center are made: (a) the former's collection is a function of its knowledge base while the latter's collection is a function of current user needs, and (b) the library's function is to archive information while the center's is to disseminate it. Following the presentation of a flow chart of information system functions, a basis for comparison of information system models is provided. Three system dimensions -- orientation toward the source of the knowledge base, degree of centralization of resources, and emphasis on formal vs. informal sources of information -- are discussed. A tentative set of user-oriented activities (as opposed to operator-oriented functions) is also introduced.

A device for generating a very large population of system objectives is then proposed. It is based on the concepts of activities, content of information flow, and user groups. Methods for coping with the more than four billion objectives which might be generated are discussed.

The chapter concludes with a discussion of model evaluation. A number of related NIE policy questions, which will require answers, are identified. The importance of criteria and measures is also briefly discussed. A symbolic model is presented to specify the major elements which enter into the evaluation of system components and overall information systems models.

5. Appendices

Five appendices contain reports of project progress, descriptions of the filing system and the experimental collection, and further analyses of alternatives for acquisition, indexing, storage, retrieval, evaluation, and dissemination.

D. Summary of Preliminary Design Phase Report

Introduction

The intent of this report, like that of the previous one, is to provide a basis for continuing dialogue between project staff and NIE sponsors, as well as representative users. This report focuses on the selection of dissemination alternatives and the development of a plan for pilot testing them.

Summary of the Report

1. Chapter I: Introduction and Review

Chapter I reviews the objectives of the project, summarizes the previous report on the planning phase, and presents responses of the NIE staff to our questions regarding their judgment of priorities for groups and activities including: (1) target groups, (2) target subgroups, (3) alternative activities for the information system, and (4) categories of information content in terms of information needs of NIE/USOE sponsors. The chapter concludes with the contents of a memorandum prepared by NIE/TFRT, responding to policy questions in the Planning Report.

2. Chapter II: The Preliminary Design Conference

This chapter narrates the transactions and recommendations of the Preliminary Design Conference. After studying the Planning Report and examining the responses by NIE staff, the conference participants examined the array of alternative products and services that had been developed during the previous project phase. Two advocate design teams then prepared independent analyses and recommendations for functions, services, and products of an information center. These recommendations led to the choice of pilot test dissemination alternatives.

3. Chapter III: Plan for Pilot Test of Dissemination Alternatives

The third chapter describes the plan for a pilot test of dissemination alternatives. Proposed products and services are listed below in four groups:

a. Announcement and Current Awareness
    - °Personnel and Training Newsletter
    - °Personnel and Training Abstracts

b. Services
    - °Hot-line Query Service
    - °Mail Query Service
    - °Walk-in Query Service
    - °Dissemination and Utilization Service

c. Informal Communication
    - °Conferences and meetings
    - °Telecommunication

d. Products
    - °Instructional Materials Catalog
    - °Grant Package
    - °Mini-Collection

°Case Study Source Book

°Literature Source Book

°Directory of Training Opportunities

Each dissemination alternative is briefly described in terms of purpose, rationale, content, and pilot-test format.

The following pilot-test samples and the rationale for selecting them are then described: (1) NIE/USOE sponsors, (2) NIE/TFRT sponsored projects, (3) degree training programs, and (4) nondegree training programs. The chapter concludes with a schedule and a description of the plan for analysis.

4. Appendices

Four appendices contain reports of project progress, response forms and data on NIE/USOE staff responses about target groups, activity and information content priorities, Preliminary Design Conference notes, and descriptions and illustrations of the selection of pilot dissemination products and services.

E. Advanced Design Phase Reports

By December 1972, it had become apparent at NIE that new initiatives in support of RDD&E training would be made only after thorough review and evaluation of current efforts and only if strong justification for needs and the cost effectiveness of proposed solutions could be submitted. Moreover, preliminary results of the pilot test of the dissemination alternatives raised serious questions regarding the need for a full-scale information center as opposed to more modest alternatives.

By mutual agreement, the original project schedule was modified. It had anticipated development of a plan for an information center, together with the delivery of a handbook of detailed procedures for implementing and maintaining the center. Instead, the pilot test was extended through what had been the time period for the advanced design phase (December 1972 - January 1973) and the resources allocated for this phase were redirected toward these activities:

1. Completion and reporting of the user study of dissemination alternatives,
2. Preparation of recommendations, together with cost estimates for promising dissemination alternatives,
3. Analysis of the content and quantity of RDD&E training resources,
4. Examination of problems and issues, and preparation of recommendations for the evaluation of RDD&E instructional materials,
5. Preparation of lists of recommended journals, reference works, and books needed to establish a "core" educational RDD&E training information collection,
6. Completion of other project activities and preparation of a final report.

Interim reports on activities 1-5 above were submitted in March, April, July, and August, 1973. Rather than summarizing each of these reports separately, the following sections have reorganized the information for a more coherent presentation.

II. ANALYSIS OF USER REQUIREMENTS

A. Description of Target Audience

The users of the proposed information system had been tentatively identified as a composite of six different groups of RDD&E personnel types: (1) sponsors, (2) performers, (3) trainers, (4) students/interns, (5) employers, and (6) practitioners. A brief description and an estimate of the size of each group, as well as its subgroups, are presented below.

1. Sponsors

Sponsors generally are personnel who make plans, policies, and decisions about dollar support for, or who directly influence the overall direction of, educational RDD&E personnel and training activities. Identified by institutional/agency affiliation, sponsors of educational RDD&E include persons in federal government, state and local education agencies, private foundations, industry and business, colleges and universities, and professional and academic associations. Figures developed by Gideonse (1969) on Fiscal Year 1968 expenditures for educational RDD&E indicate that, of the total documented minimum base of $192.3 million, 53% was provided through the U. S. Office of Education (USOE); 12% through the National Science Foundation (NSF); 7%, through the Office of Economic Opportunity (OEO); 6% through the National Institute of Mental Health (NIMH); 4% through the National Institute of Child Health Development (NICHD); 6% through other federal agencies; 4% through private foundations; and 8% through all other sponsors (state agencies, higher education institutions, and professional and academic associations). This data suggests that the largest group of user-sponsors are at the federal level. The transfer of some USOE responsibilities to the recently established National Institute of Education (NIE) will add the staff of NIE's Research Training Task Force to this group of federal RDD&E sponsors, and peripherally, the staff of other NIE task forces.

Sponsors can also be defined by function and subdivided into groups concerned with (a) planning, (b) management, or (c) evaluation of RDD&E. The number of personnel directly involved in each of these subgroups is, at present, unknown. Hopkins (1971, p. 20) estimated a total USOE figure of 156 in 1966. Making allowances for the date of that estimate and extending it to include the three functional groupings of professional personnel in other federal agencies, as well as paraprofessionals, Hood (Hood and Chorness, 1972, p. 4.9) suggested a total of 400 positions in the federal sponsor category. Adding program officers of private foundations, as well as sponsors in state and local educational agencies, the total number of sponsors probably does not exceed 1,000 persons.

2. Performers

These are the individuals who implement the plans and policies conceived, approved, and/or supported by the sponsors. Personnel in this group can be categorized as either applied researchers or developers. Applied researchers are defined as personnel engaged in a "mission-oriented" production of knowledge relevant to solution of a general problem.* Developers, on the other hand, are identified as personnel engaged in design and production of content or training materials, or new training program or product models relevant to a specific RDD&E personnel or training problem. Applied researchers, for example, might include senior authors of the American Educational Research Association (AERA) Task Force reports or the Oregon Studies in Educational Research, Development, Diffusion, and Evaluation (1972), as well as personnel affiliated with R&D centers. Developers include principal investigators, professionals, and paraprofessionals from the approximately 30 projects sponsored by the Research Training Task Force of NIE or selected personnel in regional laboratories, as well as personnel involved in a small number of development projects funded by other sources. The principal investigators probably number no more than 100 and their supporting professional and paraprofessional staff, a few hundred.

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* Gene V. Glass and Blaine R. Worthen, Interrelationships Among Research and and Research-Related Roles in Education: A Conceptual Framework, Technical Paper No. 4. (Boulder, Colorado: University of Colorado, June, 1970) p. 9.

3. Trainers

This target population consists primarily of personnel who direct and instruct RDD&E training programs and also, by loose definition, personnel engaged either formally or informally in diffusion or linkage of the R&D personnel and training outputs. Trainers can be divided into two subgroups according to affiliation with degree or nondegree granting institutions and organizations. Byers (1971) surveyed degree-granting institutions throughout the United States. Out of 405 institutions responding, she found 83 had RDD&E programs meeting the AERA definition. Byers also located and identified 55 nondegree granting agencies and organizations (including 19 state education agencies, 9 R&D centers, 19 laboratories, 7 private R&D organizations, and 1 USOE bureau) which regularly offer educational research-related training. Of 259 areas of emphasis in the 83 degree granting programs, only 10 were in "educational product or program development" and 4, in "dissemination and diffusion." The number of training directors and instructors involved in these programs might be estimated at several hundred regulars with major time commitments and several hundred more who occasionally teach a course or short-term institute.

The diffusion-linking group is of potential importance, not so much because of its size, but because of its promise for stimulating interest in, and providing a channel for, delivery of decision-oriented, disciplined-inquiry training resources to educational practitioners. The projected proportional growth in diffusion positions anticipated by Clark and Hopkins (1969) has not been realized; we base this conclusion on available overall RDD&E position estimates (Hopkins, 1971), on evidence regarding training capacity (Fleury, 1968; Byers, 1971), and on demand and supply (Goodwin and Worthen, 1970).

4. Students and Interns

This group consists of students and interns who undertake R&D training programs on either a perservice or an inservice basis. The relatively slow growth of preservice training programs for paraprofessionals or technicians and undergraduates suggests that the number of users at this level of study may be small.

At graduate levels, the preservice consumer audience is larger. Byers (1971) showed that, at the end of the 1970-71 academic year, there were 707 subdoctoral and 1,053 doctoral students enrolled as degree majors in educational RDD&E programs. Brezinski and Smith, in their synthesis of RDD&E manpower supply and demand (1971), suggest that, in spite of the phase-out of the Title IV Graduate Research Training Program, a large number of persons are and will continue to be trained in RDD&E on a formal basis. Enrollment at 53 institutions responding to a questionnaire, they reported, included 443 persons at the subdoctoral level and 495 at the doctoral level. In addition, three recently funded RDD&E training consortia anticipate training approximately 225 persons at the doctoral and master's levels over the next three years. In sum, it appears that the preservice consumer audience in undergraduate and graduate degree programs will number at least 1,000 (per year) and possibly as many as 2,000-3,000 if "minors," as well as "majors," are included.

The number of inservice consumers--RDD&E employees involved in continuing education or short-term training--is unknown. When the personnel training needs of a number of existing R&D-related organizations and agencies (e.g., regional laboratories, R&D centers, private, nonprofit R&D agencies, state education agencies, colleges and universities) are taken into account, however, the prediction made in the proposal for this project becomes quite real. The proposal stated there will be "...a marked increase in the number, diversity, quality and duration of training [and, hence, in the number of training consumers] offered by nondegree granting organizations." A consumer audience appears to exist among presently employed or newly recruited RDD&E personnel who need to maintain awareness of current developments or to gain specialized knowledge and skill training pertinent to their work. This group appears to be potentially as large as, if not larger than, the preservice consumer audience.

5. Employers

This group is represented by the organizations, institutions, agencies, and limited-term projects who hire personnel to perform RDD&E and related functions. Hood (Hood and Chorness, 1972, p. 4.8) estimated there might be 1,500 such active educational RDD&E projects receiving federal funding through USOE Cooperative Research or educational R&D sources in NSF, OEO, NIMH, and OCD. Because a single institution can receive support for several projects, however, the actual number of federally funded organizations should be estimated at only 1,000 to 1,300.

Although this "core" of federally funded educational RDD&E projects certainly is the primary employer target, there are other employers of major interest, including: state educational agencies, local educational agencies, and nonprofit and profit-making R&D agencies operating with federal or other funding. In addition, there are substantial applied research, development, dissemination, and especially, evaluation project activities supported under other USOE funded programs (e.g., evaluation of ESEA Titles I and III projects). Data supplied by Gideonse (1969), Clark and Hopkins (1969), and Hood (Hood and Chorness, 1972) suggest that nearly half of the total educational RDD&E funding may come from these other-than-"core" federal sources.

State, intermediate, and local educational agencies who are not recipients of federal educational R&D funding constitute another major category of employers. It is difficult, however, to estimate the number of these who have an active or potential interest in educational RDD&E personnel and training information. Although there are approximately 19,000 elementary and secondary education systems and 2,600 colleges and universities, only a small fraction of them employ even a few full-time educational RDD&E professionals.* This contention is supported by Bargar and Hagan's finding (1970) from a survey of Ohio public school administrators. Although these administrators were receptive to employing trained RDD&E personnel, they indicated that openings for such personnel do not exist, apparently because of a lack of funds or demand. Their responses indicated that 56% of large districts, 100% of medium districts, and 83% of small districts did not anticipate any openings in the 1969-1970 period for R&D trained graduates. Brzezinski and Smith (1971) contend that availability of funding will be the critical variable affecting the demand for RDD&E personnel. The potential employer-market at the local level for RDD&E personnel and training information would also probably be affected by this same variable.

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* For instance, National Educational Association survey data (Hood and Chorness, 1972, p. 4.9) shows only 30% of major school systems (LEAs enrolling 12,000 or more students) reporting one or more research administrator positions. Hopkins (1971) estimated 270 positions. NEA (1971) documents 321 positions in 137 school systems. Making allowance for paraprofessionals, Hood (Hood and Chorness, 1972) estimated the LEA full-time equivalent RDD&E positions as less than 500. With respect to colleges and universities, Hopkins' (1971) projections for 1974 education R&D positions suggest approximately 3,000 positions in educational RDD&E at colleges and universities in other than federally supported subunits (such as R&D Centers, ERIC Clearinghouses, Handicapped or Vocational Education R&D Centers).

A survey of RDD&E employers in the San Francisco Bay Area (Hood, Banathy, and Ward, 1970) documented that there is another substantial area of R&D activity in business, industrial and nonprofit R&D agencies which employ personnel with RDD&E competencies and which are not supported by "core" federal funding. This employer sector is a competitor for educational RDD&E talent and a potential "customer" for educational RDD&E personnel and training information products or services.

6. Practitioners

Other than the lay public, educational practitioners are the most distant, but also the largest, group of potential users of educational RDD&E personnel and training information. Most practitioners are (or will be) employed by one of the classes of actual or potential RDD&E employers discussed above. It is conceivable to us that this group includes all elementary, secondary, technical, and higher educaton teachers, administrators, and other staff, as well as educators working in educational professional associations, foundations, etc.

This population potentially will total several million people. As suggested in the project proposal, this entire population as a target represents a diffuse, hard-to-reach audience which may be largely beyond the scope and purpose of this information system's products and services. Isolating the smaller number of practitioners in direct RDD&E functions or positions is difficult, since according to Brzezinski and Smith (1971), reliable figures on the number of personnel currently employed in RDD&E do not exist. Much of this important subpopulation may, however, be reached because of overlapping memberships in one or more target groups mentioned.

B. Data on Information Needs of User Groups

The description in section A of the information needs of the six potential user groups for our system is, at best, a difficult task. Although substantial research on user information needs has been done in science, engineering, and psychology, among other disciplines, there is a general paucity of research on user information needs in education and specifically in educational RDD&E. Dershimer (1970, p. 1) reported that with the exception of "...two analyses of communication networks made by Garvey and Lingwood, little precise information exists about the [communications] behavior of persons in educational research." Time and financial constraints on this project preclude the possibility of conducting an extensive survey of R&D information users and their needs. However, information on user needs was collected from small but representative samples of high priority target groups as part of the pilot test of dissemination alternatives.

1. Purpose of the User Study

To delimit design parameters for an RDD&E personnel and training information system, the project staff conducted a pilot test of a prototype system. Feedback was sought from members of potential populations regarding their priorities for target user groups, information content areas, information-seeking purposes, and products and services of the system.

2. Description of Sample

Based on NIE priorities presented in the project's Interim Report of the Preliminary Design Phase, five types of target user populations were selected for involvement in the pilot test: sponsors, researchers, model/materials developers, degree trainers, and nondegree trainers. The samples from each population are described below:

Sponsors. Although not representative of the full range of sponsors, five NIE staff active in researcher training and related projects were chosen purposively by the project staff as a central and significant sample. The group included staff from the Task Forces on Researcher Training and Dissemination.

Researchers. The lack of a substantial base of persons actually doing, or highly cognizant of, applied research on RDD&E training precluded the use of random sampling procedures to select this group. A purposive sample of five persons identified by the project staff as recognized experts in the field was therefore used.

Model/Materials Developers. A simple random sample of nine was drawn from a list of three model consortia and 30 models and materials development projects funded by the NIE Task Force on Researcher Training, with the project director as the contact. Although this sample does not include other types of development projects, such as R&D programs of laboratories and centers, it does draw from the core of personnel actually producing RDD&E training.

Degree Trainers. A 6% simple random sample (N=9) was drawn from the set of degree-granting programs reported in the 1971 AERA Directory of Training Opportunities in Educational Research and Related Areas. The contact person listed in the Directory was the proposed subject.

Nondegree Trainers. A 15% simple random sample (N=9) was drawn from the set of nondegree granting programs again reported in the 1971 AERA Directory. The contact person listed in the Directory was the proposed subject.

The samples for sponsors and researchers may inadequately represent the full range of interests of these two groups; however, the other three samples, although small, are true random samples of significant, enumerated populations.

3. Procedures

The user study was conducted as part of the pilot test of dissemination alternatives (to be discussed in a later section of this report).

Initial arrangements for participation in the product/service review were made through a telephone call to each contact person in the developer, degree trainer, nondegree trainer, and researcher samples. During that call, the purpose and procedures of the review were explained to the subject and an appointment for a follow-up interview within two weeks was scheduled. A package of materials was then mailed to the subject, along with a letter restating briefly the review procedures and confirming the date of the follow-up interview. Subjects were also asked to return by mail four response forms (similar to those previously completed by the sponsor sample) on which they indicated priorities for types of users, purposes, content, and outputs of the proposed information system. The subsequent telephone interview, requiring about 30 minutes to complete, asked subjects to indicate the utility and importance of each product and service. They were asked to explain whether or not it would be useful and to supply other relevant information.

4. Summary of Information Needed

Information needs vary with user, time, purpose, location of information, and sources, among other factors. The following specification of types of information needed by the identified user groups is derived from analysis of the utility and/or desirability of information input to the specific user.

Sponsors. The information needs of this target group are quite diverse. For the small number specifically concerned with personnel and training, nearly all types of information are needed: published and unpublished papers and reports on RDD&E-related policy, theoretical and practical issues; personnel supply and demand information, particularly personnel requirement trends and critical skills shortage areas; detailed information on the content, progress, and evaluation of sponsored training programs and projects. For the larger number concerned with planning, management, or evaluation of other educational RDD&E, personnel and training information needs appear to be detailed only in aspects under the specific sponsor's purview.

Interviews revealed especially the need for assistance in locating specific training practices, materials, or persons competent to conduct training in order to provide assistance to other agencies, such as, state departments of education and local school systems, and for similar assistance in conducting inservice training for USOE or NIE staff. Two individuals emphasized needs for personnel supply and demand information, with emphasis on details about available or potential supply and ability to perform. Two cited the need for information on validated RDD&E methodology or practice, especially how to diffuse these practices and provide for their utilization. Other needs mentioned included information on training facilities and capabilities and on the state of knowledge regarding personnel and training issues.

Performers. Members of this group have a wide range of information needs. There is general interest on the part of both applied researchers and developers in information on policy, trends, theoretical issues, and research on training. Applied researchers have specific interests in RDD&E methodology and in descriptions of research and development on RDD&E training, as well as in analyses of RDD&E competency clusters. Developers, on the other hand, have special needs for job and task analysis information; RDD&E case studies; employment trend information, with details on skill, knowledge, and content shortage areas; directories of evaluated RDD&E instructional materials and resources; and details on the content and nature of RDD&E training developments in progress.

The heavy emphasis on the need for knowledge of all aspects of RDD&E instructional materials and program development was shared by all interviewees who were themselves currently engaged in R&D training materials development. All indicated a need for detailed descriptions of research and development on RDD&E training. Several cited a need not only for directories of instructional materials, but also for access to the materials. Need for evaluations of such materials was mentioned by two. Three other developers indicated a need to know what other projects were doing in development--particularly in terms of guidelines, objectives, and procedures for evaluation of products. One cited a need for information on funding trends and policy issues. General interests in various areas such as supply and demand trends, marketing, and job/task/competency analysis were also expressed.

Trainers. The degree training director and nondegree trainers share general interests with developers and, to some extent, sponsors in policy, issues, funding and supply/demand trends, and developments affecting RDD&E. They appear, however, to be particularly in need of information on theoretical issues, methodology, and research on R&D. Like developers, they could also use directories of validated instructional materials and curricula and specific training aids, such as, outlines, case studies, compendia of readings, exercises, and competency tests. Personnel directories and precise information on employment and internship opportunities for students are also special needs of this group.

5. Information-Seeking Purposes

Each informant was asked to allocate 100 points among several alternative purposes for seeking RDD&E personnel and training information according to the priority the informant attached to that purpose. Table 1 presents the averages for each group as well as a weighted average. (The basis for the weightings will be described in Chapter III).

The weighted averages indicate that our 32 informants* allocated highest priority to seeking information regarding "results of related work performed by others." This is followed closely by "to keep current on general developments." Three purposes assigned almost equal priorities are "seeking information to develop alternative approaches to problems," "finding answers to specific questions," and "identifying relevant procedures, methodology and materials." Next most important is "gaining theoretical information." Of lesser importance is "to keep current on workers in specific problem areas," "acquiring ideas for new work," and "developing comptency in an area by reviewing the state-of-the-art." Least important is the need for obtaining information to "develop educational materials."

The sponsor group was unusual in specifying priority needs for specific "other" information (e.g., prepare public information, evaluation reviews to judge quality of programs, provide basis for policy formulation). The sponsor group is also distinguished from the other groups by the low priority it attaches to gaining theoretical information.

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* Everyone approached cooperated and only one person failed to accomplish the task. The 87% usable response rate is due mainly to persons who could not be contacted in time.

TABLE 1: SAMPLE GROUP ALLOCATION OF 100 POINTS TO DESIGNATE PRIORITIES AMONG PURPOSES

Reasons for Wanting Information	Sponsors	Researchers	Developers	Degree Trainers	Nondegree Trainers	Overall Weighted
1. Acquire ideas for new work	6.25	5.50	4.25	12.50	10.63	7.66
2. Support work in progress by:						
a. Gaining theoretical information	2.50	12.50	13.50	8.25	6.88	8.67
b. Developing alternative approaches to problems	7.50	12.50	9.75	8.50	12.50	9.95
c. Determining results of related work performed by others	11.25	20.00	13.25	12.25	12.75	13.97
d. Finding answers to specific questions	7.25	6.25	12.50	11.00	11.63	9.49
e. Identifying relevant procedurs, methodology, materials	8.25	5.00	15.88	11.63	9.38	9.92
3. Keep current on workers in specific problem areas	9.00	8.00	4.63	8.38	10.00	7.94
4. Keep current on general developments	9.25	18.75	12.13	14.38	13.75	13.61
5. Develop competency by reviewing the state-of-the-art	7.50	7.50	6.50	5.63	9.38	7.17
6. Prepare educational materials	0.--	4.00	6.50	7.50	3.13	4.19
7. Other ________	31.25	0.--	1.13	0.--	0.--	7.44
Total	100.00	100.00	100.02	100.02	100.03	100.01
Sample Size	N=4	N=4	N=8	N=8	N=8	N=32
Usable Response %	80%	80%	89%	89%	89%	87%

The researchers exhibit a pattern similar to the weighted average, placing greatest emphasis on "determining results of related work performed by others" and on "keeping current on general developments" and least emphasis on "acquiring ideas for new work," "identifying relevant procedures, methodology, materials," and on "preparing educational materials." Researchers are most unlike developers and trainers in their higher priority for "determining results of related work," and their lower priorities for "finding answers to specific questions" and for "identifying relevant procedures, methodology materials."

The priorities indicated by the two trainer groups are quite similar. The rank order correlation is .81. The only items differing by more than two points are that nondegree trainers indicate higher priorities for "developing alternative approaches to problems" and for "developing their own competency by reviewing the state-of-the-art." Degree trainers, however, place greater emphasis on "need for information in preparing educational materials." Overall, these are the major purpose priorities for trainers, in descending order: (1) "keeping current on general developments," (2) "determining results of related work performed by others," (3) "acquiring ideas for new work," (4) "finding answers to specific questions," and (5) "identifying relevant procedures, methodology, materials.

The developer group exhibits a markedly different pattern of priorities on purposes for making information requests. The rank order correlations are only .35 with degree trainers and .28 with nondegree trainers. There are two purposes for which priority differences are most apparent: developers place lower priority on "acquiring ideas for new work" and higher priority on "gaining theoretical information." These are the major purposes for developers: (1) "identifying relevant procedures, methodology, materials," (2) "gaining theoretical information," (3) "determining results of related work," (4) "finding answers to specific questions," and (5) "keeping current on general developments."

6. Content of Information Sought

Each informant was also requested to allocate 100 points among preferred categories of information content to show how important a particular category is.

The average priorities for each target group and the weighted averages are presented in Table 2. We had anticipated that target groups would differ. Sponsors and degree trainers are least alike (Rho=.25) and developers and nondegree trainers are most alike (Rho=.87).

Overall, the weighted priorities indicate that these are the five most important content areas (in descending rank order): (1) "theory and concepts"; (2)"research on educational R&D"; (3)"policy, roles, and strategy"; (4) "methodology" and, (5)"training model descriptions." These five areas received over half of the weighted priority points. For sponsors, these same five content categories, in different rank order, are top choices, although "supply and demand" ties with "theory and concept" for fifth place. Developers also assign top priority almost to the same five categories, but place "training resource descriptions" fifth and "training model descriptions" sixth. Researchers are also consistent on the first four, but markedly downgrade the importance of "training model descriptions." Perhaps remarkable is that more than half of all the researchers' content priorities are for just three of the fourteen content categories, namely: "theory and concept," "policy, strategy and roles," and "research on educational R&D."

TABLE 2: SAMPLE GROUP ALLOCATION OF 100 POINTS TO DESIGNATE PRIORITIES AMONG INFORMATION CONTENT

Information Categories	Averages of Sample Group Allocations					
	Sponsors	Researchers	Developers	Degree Trainers	Nondegree Trainers	Overall Weighted
1. Methodology....................	10.25	8.82	13.75	7.86	11.25	10.25
2. Theory and Concept..............	7.50	19.32	11.12	10.00	10.62	11.75
3. Policy, Strategy, Roles..........	10.50	17.52	11.62	7.36	9.75	11.46
4. Research on Educational Research and Development........	10.75	16.75	11.75	7.86	10.12	11.54
5. Training Model Descriptions......	10.25	2.75	8.25	12.14	7.38	8.23
6. Training Resource Descriptions...	6.50	6.75	8.38	3.86	5.62	6.23
7. Training Resources..............	6.50	7.52	7.50	9.00	5.62	7.33
8. Assessment Devices..............	5.50	2.52	5.25	7.93	7.62	5.63
9. Supply and Demand...............	7.50	2.75	1.38	3.14	2.12	3.57
10. Programs Producing Talent........	3.50	2.52	3.38	3.29	4.69	3.39
11. Training Opportunities..........	4.25	3.00	2.62	3.00	4.56	3.44
12. Job Market/Placement............	6.50	2.75	3.38	5.86	3.44	4.50
13. Consultants/Experts.............	6.50	2.00	3.75	3.57	6.69	4.39
14. Program/Project Descriptions.....	2.00	5.00	7.88	10.86	10.50	6.91
15. Other...........................	2.00	0.--	0.--	4.29	0.--	1.38
Total	100.00	99.97	100.01	100.02	99.98	100.00

Nondegree trainers allocate over half of their priorities to the five categories: "methodology," "theory and concepts," "program/project description," "research on R&D," and "policy, roles, and strategy." Degree trainers allocate their top points to "training model descriptions," "program/project descriptions," "theory and concepts," "training resources" (the actual materials) and "assessment devices."

Sponsors differ most from all other groups in that they alone attach importance to "supply and demand information" (it's the least important specified category for all other groups) and, conversely, the sponsors attach markedly less importance to "program/project descriptions." As noted previously, researchers are distinguished by the very high priority they attach to just three content areas: "theory and concepts," "policy, strategy and roles," and "research on educational R&D." Researchers place far less emphasis on "training model descriptions" and "assessment devices."

Developers and degree trainers exhibit several moderate differences, e.g., developers set higher priorities on "methodology," "policy, roles and strategy," "research on R&D" and "training resource descriptions"; while degree trainers set higher priorities for "training model descriptions," "program project descriptions," and "other" content. As noted, developers and nondegree trainers were very much in agreement on priorities. The largest differences are found in the developers' higher relative priorities for "program/project descriptions."

Degree and nondegree trainers differ on relative priorities for several content areas, with degree trainers attaching more importance to "training model descriptions," "training resources," "job market and placement information," and "other" information; while nondegree trainers indicate markedly higher priorities for "methodology" and "information regarding consultants and experts."

These data clearly suggest that an RDD&E personnel and training information center must be concerned with access to a broad range of information if it is to satisfy its various clients. There is some focusing, five broad content areas ("methodology," "research on R&D," "policy, roles and strategy," "training model descriptions," and "theory and concepts") account for half of the weighted priority. Every category drew at least a modest priority, from at least one target group, with no category receiving appreciably less than half the priority it would have received if priorities were allocated equally over all 14 specified categories. The only two categories of information content receiving less than 5% of the priority points from all of the five groups are descriptions of programs producing talent" and "descriptions of training opportunies." Some group believes they need information about nearly every one of the information content areas. Conversely, no content category received a predominant priority. "Theory and concept," the top weighted category, received 11.75% of the weighted priorities; it is also the highest priority for any of the groups, with researchers assigning it only an average of 19.32 of their 100 points).

Hence, there is no hope of specializing with great emphasis on only a few information content categories of unusually high priority. The information needs of the target audience are just too diverse, both with respect to needed content and purpose.

Discussion of the preferences of these five target audiences for specific information products and services will be found in Chapter III. Before turning to that subject, we shall present further data on target group information needs by resorting to data obtained by the NIE Researcher Training Task Forces's R&D Training Information Needs Survey, which was completed by 27 respondents attending the 1972 AERA presession on research training projects. Our interpretation of these responses leads to the following conclusions.

Students and Interns. The information needs of both preservice and inservice students and interns parallel closely those of trainers and developers in the areas of instructional materials and resources, case studies, theoretical and policy issues, job and task analyses, and RDD&E methodology. Their needs are probably more intense,however, for actual instructional materials, for specific information regarding R&D employment/internship opportunities, and for general information regarding education and career planning.

Although only two of the respondents to the R&D Needs Survey considered themselves as representative of the student/intern user group, the group's perception of student/intern information needs still has some relevance for this analysis. However, even though respondents felt qualified to specify the types of information students needed, they tended to vary more than the other user groups in their degree of need (high degree vs. low degree). The largest percentage of agreement among respondents--74%--indicated a high student/intern need for periodic listings of training opportunites for various RDD&E competencies. About 85% indicated there was a need for case studies of RDD&E and about 81% indicated a need for copies of instructional materials/packages. But in the former case, only 56% felt the need was "high" and, in the latter, only 51%. Again, about half the respondents also perceived that students would have "high" needs for papers on theoretical issues and on research in educational R&D. Fewer respondents (about 50%) saw high needs for personnel supply/demand information, especially for identification of programs which will produce various competencies, for statistical reports, and for analysis of competency clusters needed in various roles. Student information needs were apparently perceived as fewer and less intense than either trainers or developers--which suggests that the possibility that involvement by a trainer/instructor may have had an effect on the respondents' judgments.

Employers and Practitioners. The employer group undoubtedly needs personnel supply and demand information, particularly in specific terms of available applicants or of institutions which can supply talent. There also appears to be an even greater potential need for information on relevant continuing education programs or instructional resources which could be used to support an employer's continuing education program.

By contrast, the information needs of the practitioner group, appear to be much less specific, more diffuse, and general. This group's awareness of, and interest in, educational R&D may be reactive. Their needs, therefore, may have to be serviced only through provision of digested information on research and methodology of R&D, as well as on R&D products/instructional materials and on personnel demand trends.

Data verifying the information needs of both employers and practitioners is limited. In the R&D Needs Survey, R&D managers/employers/practitioners were identified as a single potential user group. The diverse interests represented in this one category may account for the variability in the responses. The two areas of "high" need were "identification of programs producing various competencies" (70%) and "papers on R&D policy issues" (6 %). Slightly less than 60% of the respondents perceived that this group of users would have high need for increased access to periodic listings of training opportunities and for instruments to assess RDD&E competencies. About half saw users needing analyses of competency clusters for various R&D roles and evaluations of published instructional materials. The greatest emphasis was thus placed on needs for personnel supply and demand information, with a lesser emphasis on general information about R&D policy and issues and about RDD&E instructional materials.

C. Target Audience Requirements

Table 3 summarizes the project's initial estimate of the sizes and probable needs of each major audience, as well as an assessment of the benefits or lost opportunity costs likely to be experienced by them.

Table 3 is more prescriptive than descriptive regarding users' needs in that it lists what users should need (e.g., supply and demand information, job market/placement information) in addition to the common high priority content areas listed in the previous section (e.g., research on R&D, methodology, theory and concepts, policy, strategy and roles) if each class of users is to perform its roles more effectively. The table also suggests the benefits or lost opportunity (cost regret) which the presence or absence of such information may cause.

Table 3

TARGET AUDIENCES FOR EDUCATIONAL
RDD&E TRAINING & PERSONNEL INFORMATION

TARGET AUDIENCE	ESTIMATED SIZE	PROBABLE NEEDS, BENEFITS, AND COST REGRET
Sponsors	400-1000 persons in planning, management or evaluation. Approximately 20 persons directly involved in planning management or evaluation of RDD&E training.	Adequate, timely information regarding numbers and types of trained RDD&E personnel, supply, demand, production rates, skills, shortage areas, and state-of-the-art for delivery of training in specified RDD&E skill areas and subject content areas is essential for realistic planning and management, especially for large-scale directed R&D or practice improvement programs. Lack of accurate information may result in misallocation of resources, choice of inefficient or ineffective strategies and approaches, program drift, delays or failures in achievement of objectives.

TABLE 3 (CONTINUED)

TARGET AUDIENCE	ESTIMATED SIZE	PROBABLE NEEDS, BENEFITS, AND COST REGRET
RDD&E Instructional Materials/ Program Developers	50-100 principal investigators, several hundred performers.	Information regarding personnel trends, skills shortage areas and newly emerging needs can create awareness and capability to propose and develop needed training materials/ programs. Specific information regarding required competencies, work contexts, levels of skills, etc. is needed for efficient design and development of curricula and instructional materials. Information regarding instructional materials and methods now available or in development elsewhere can increase effectiveness and reduce costs of developments. Lack of information may result in failure to respond to critical training needs, in duplication of effort, or in programs or materials inefficient. Inability to provide for dissemination of information regarding training developments may result in underutilization by intended targets.
RDD&E Training Program Directors/ Instructors	80-120 degree program directors; 80-120 nondegree program heads; several hundred instructors.	Information regarding personnel trends, skills, shortages, emerging federal program support is needed to justify and establish new training programs or to modify existing ones. Instructional materials catalogues, directories of training consultants and curriculum development aids are needed to quickly and efficiently develop new programs or modify existing ones. Information regarding employment and intern opportunities and trends is needed to counsel and place students and interns. Access to case studies, published and unpublished papers and reports, and knowledge of what other programs are doing can stimulate innovation and renewal of program content and method.

TABLE 3 (CONTINUED)

TARGET AUDIENCE	ESTIMATED SIZE	PROBABLE NEEDS, BENEFITS, & COST REGRET
		Lack of information can result in these consequences: serious misdirection of training resources resulting in over-supply or shortages of trained talent *vis à vis* the employment market; added retraining costs or inefficient use o personnel by subsequent employers; failure to attract or hold highly qualified candidates; failure to place students in effective internships or in appropriate jobs and; inefficient use of training and educational resources.
Students and Interns	1750-2000 persons in degree programs, possibly 1000-2000 more in significant "minors," several thousand more full-time employees in continuing education.	Many needs of the student/intern group may be met indirectly through the training program/instructor group. The student group will especially profit from the availability of information on programs and materials and of intern opportunities that will prepare them both for immediate and long-term employment in RDD&E positions. Information concerning job and training opportunities is of particular interest to the person considering enrolling in an RDD&E program. Job opportunities are of special interest for those seeking full or part-time employment. The full-time employee in a continuing education program is specially interested in where and how he can upgrade his competencies. Benefits and cost regret for trainees are similar to that for programs.

TABLE 3 (CONTINUED)

TARGET AUDIENCE	ESTIMATED SIZE	PROBABLE NEEDS, BENEFITS, & COST REGRET
RDD&E Employers	1000-1300 federally funded projects, several hundred larger local education agencies, possibly a 1000 colleges and universities, several hundred R&D agencies, and organizations.	Employers need general information regarding supply and demand in order to effectively plan and manage their R&D efforts. Benefits and cost regret are similar to federal sponsors though usually on a much smaller scale. Knowledge of job applicants or programs producing applicants, especially in critical skills shortage areas can reduce recruitment and training costs. Knowledge of effective training programs or validated materials that can be made available to employees can reduce training costs and raise efficiency.
Practitioners	May include several million teachers, administrators, and other professionals.	General knowledge regarding educational RDD&E may create awareness, interest and willingness to support investment in and readiness to utilize results of educational R&D. RDD&E students and performers may be recruited from this population. Many members of this target group are potential part-time users of decision-oriented disciplined inquiry or are decision-makers regarding utilization of R&D products. Benefits and cost regret of RDD&E training information per se are hard to estimate, but may be relatively much less important than for other target groups.

III. PROMISING ALTERNATIVES FOR THE DISSEMINATION OF EDUCATIONAL RDD&E PERSONNEL AND TRAINING INFORMATION

As part of a pilot test of alternatives for disseminating information about RDD&E personnel and training, samples from five potential target user groups were contacted to evaluate fourteen possible information products and services. These products and services, the pilot test procedures and sample selection, and the overall results of the user evaluation are briefly described in the first section of this report. A second section presents an analysis of the purpose, rationale, user evaluation, and cost estimates of the top rated dissemination alternatives. Conclusions and recommendations are contained in the summary section.

A. Pilot Test

1. Selection of Products

The project staff and consultants considered a large number of alternatives for dissemination. Given the general character of the emerging design for a proposed information system, they were nearly unanimous in nominating several products and services (i.e., announcement brochure, newsletter, inquiry services) as essential. A second set of products or services survived screening as possible alternatives. Fourteen dissemination alternatives were finally selected for inclusion in the pilot test.[1] These are grouped below by type:

Announcement & Current Awareness

Personnel and Training Newsletter

Personnel and Training Abstracts

Services

Hotline Query Service

Mail Query Service

Walk-in Query Service

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[1] The selection of products is described more fully in the Interim Report of the Project's Preliminary Design Phase (Hood and McCutchan, December, 1972, Chapters II and III, and Appendix D).

Informal Communication

Conferences and Meetings

Telecommunication

Products

Instructional Materials Catalog

Grant Package

Mini-Collection

Case Study Source Book

Literature Source Book

Directory of Training Opportunities

Dissemination and Utilization Service

Technical advice on "marketing," copyrights, and publication of instructional materials.

2. Selection of Samples

Based on NIE target group priority data (Hood and McCutchan, December 1972, Chapters I, III, Appendix B), five target user populations were selected: (1) NIE/USOE Staff (sponsors); (2) NIE/Research Training-sponsored Project Developers (performers); (3) Degree Training Program Directors; (4) Non-Degree Training Program Directors; and (5) Researchers (on educational R&D personnel and training).

Given the absence of appropriate sampling frames for the sponsor and researcher populations, five NIE/USOE staff and five researchers, each with several years of experience in the field, were selected. Eight supplied usable data. For the performer, degree program director, and non-degree program director populations, nine persons were selected randomly from each of three lists: (1) a list of recent and currently funded Research Training Project directors, (2) a list of directors of degree-granting educational R&D training programs compiled from the 1971 AERA Directory of Training Opportunities, and (3) a list of directors of non-degree training programs also compiled from the 1971 Directory. Eight of the nine developers, seven of the nine degree trainers and eight of the nine nondegree training directors provided usable information. The total number of usable responses was 31 (out of 37 selected).

3. Procedures

Each person was contacted by telephone (or in a few cases, visited personally). That initial contact was used to explain the information design project and to request assistance in the pilot test. A package of materials containing descriptions of each of the 14 dissemination alternatives and a response form was then sent. Approximately two weeks later, each person was contacted again and interviewed over the telephone. Each person then completed and returned the response form on which 100 points were allocated among the 14 alternatives in terms of priority preferences.

4. Results

Table 3 presents the summary point allocations for the seven highest priority alternatives. Each unweighted average represents the simple sum of points assigned by the 31 respondents to an alternative divided by 31. The weighted average was obtained by weighting the five averages for the five target groups,[2] summing these weighted averages, and then dividing by five.

The weighted and unweighted averages are quite similar. In both cases, the top seven (of 14) alternatives received 68% of the points.[3] The two

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[2] The weights were obtained from information supplied by each respondent regarding his priority allocation for serving each of 16 target sub-groups. Points assigned by the five sub-groups to the same five sub-groups were computed, rescaled, and used as initial weights which were applied to obtain a new set of weighted averages. The weighted averages were in turn summed to compute new weights. After several iterations, the weights stabilized at: sponsors, .231; developers, .195; degree trainers, .214; non-degree trainers, .143; and researchers, .217.

[3] An analysis of variance was performed using an unweighted means analysis for multifactor (dissemination alternatives and target sub-groups) experiments having repeated measures. The results indicate that there is a significant alternatives-by-target-groups interaction ($P < .05$), indicating that groups do differ in their priorities; but the main effect for alternatives is highly significant ($P < .005$) when tested against this significant interaction term.

TABLE 4

PRIORITY POINTS AWARDED TO THE SEVEN TOP DISSEMINATION ALTERNATIVES

	Weighted Average	Unweighted Average
1. Newsletter	14.05	15.52
2. Annotated Listing of Current Literature (Abstracts)	12.15	11.35
3. Literature Source Book	10.41	9.28
4. Instructional Materials Catalog	9.02	8.99
5. Hotline	8.20	8.02
6. Answer Mail Inquiries	7.39	7.86
7. Case Study Source Book	6.99	7.34
Total (of 100 possible points)	68.21	68.36

announcement-and-current-awareness items, Newsletter and Annotated Listing of Current Literature (or Abstracts), topped the list and accounted for over one fourth of the priority points. Two of the services, the Hotline and the Mail Query, ranked fifth and sixth respectively. The three top products were the Literature Source Book (third), the Instructional Materials Catalog (fourth) and the Case Study Source Book (seventh).

B. Description of Top Dissemination Alternatives

The description, rationale, user study documentation, and cost estimates for these seven dissemination alternatives are described below.

1. Announcement and Current Awareness

The following two items have the general purpose of "broadcasting" information to targeted audiences:

Personnel and Training Newsletter. The major purpose of the Newsletter is to provide key target audiences (especially NIE/USOE staff, Researcher Training contractors/grantees, other RDD&E training "performers" engaged in program planning or evaluation, research, development, or diffusion, and training program directors) with concise, current news and information about personnel and training.

The rationale for a Newsletter is based on the practical experience of many information centers that no other single activity is as cost effective for creating and maintaining awareness of the existence and capabilities of an information center. If a Newsletter is well written and targeted to the interests and current information needs of its readers, it will catch the attention of individuals otherwise too busy to attend to specialized information. Since personnel and training will be a "part-time" concern of the great majority of the members of any of the target audiences, the Newsletter provides an opportunity to call their attention to information items which otherwise might go unannounced or unnoticed.

The content of the Newsletter may include: announcements of RFP's, awards, reports, meetings and conferences; substantive descriptions of major policy papers, research reports, case studies, and materials developments; and solicited articles on R&D personnel and training needs, issues, methodology, and models. It also may regularly announce special services and products of the information center.

The test format of the Newsletter consisted of three issues (November and December 1972 and April 1973) each between four to nine pages, standard 8 1/2" x 11" paper, typewritten, single-spaced copy, offset press. Copies of the two 1972 issues were mailed to each of the 31 pilot test respondents; all three issues were distributed to 150 other target users.

Personnel and Training Abstracts. The purpose of this product is to call attention to publications available through ERIC, National Technical Information Service (NTIS), Psychological Abstracts, and other collections which might be of interest to the various target audiences.

The rationale for this product rests in documented findings (Fry, 1972; Wanger, 1972) that relatively few ERIC users routinely scan Research in Education or the Current Index To Journals in Education. Moreover, we suspect that few members of the target audiences have access to or would bother to search the NTIS Weekly Government Abstracts, Psychological Abstracts, or similar sources. Some kind of product providing current awareness of new literature is desirable. A selective dissemination of information (SDI) format was considered, but rejected because: (1) the subject of educational RDD&E personnel and training is already a relatively narrow content area and (2) the cost of developing even a few group interest profiles and publishing separate SDI packages would be much too great.

The Abstracts use a simple subject category arrangement to facilitate quick scanning of contents. The content of the Abstracts represents current selections on educational RDD&E personnel and training from RIE, CIJE, NTIS, and other abstract or citation publications. The selections are organized by relevance to various educational RDD&E personnel and training topics. Each selection is listed by title, accession number, author, date of publication, length, and cost of microfiche and/or hard copy. In addition, an abstract or annotation is presented with each selection.

Abstracts have been designed as a separate product which may be mailed with the Newsletter at no great additional cost. Its test format paralleled that of the Newsletter. One issue was mailed to a large user group with the first Newsletter, and a copy was also included in the package mailed to each of the 31 pilot test respondents.

The user study results show the two current awareness items ranked first and second, jointly receiving over one fourth of all the points assigned. Although the sponsor group assigned the Newsletter a remarkably low average of 2.75 points,[4] all four of the "field-based" groups--developers, degree-trainers, non-degree trainers, and researchers--gave the Newsletter top priority. They saw the Newsletter as a quick and easy means of keeping informed about general developments and current activities in the field of RDD&E personnel and training. Developers commented that it "...is a convenient and efficient way to keep up to date" and "...gives an idea of current status in the field." Others saw it as "political" -- it tells them "who's doing what" or gives them "leads on hot projects or for any project I might be working on." Degree trainers shared similar perceptions about the convenience and efficiency of the Newsletter and were able to relate it to their own planning needs--perceiving it as a means to get ideas for training or as a source of names and projects to contact. Nondegree trainers mostly saw the Newsletter as a useful awareness device to "...gain information about what's going on in R&D." One researcher noted that there simply was no good source of information about personnel and training. Another researcher gave it top priority because of its very high "utility" and "importance" in providing screened, current information in a manageable form.

Regarding the annotated listing (Abstracts) of current literature, several persons commented that it overlapped in content with the monthly abstracts in Research in Education, but might be useful to people who do not review RIE frequently. Several developers and trainers found it a "succinct," "handy" way to keep informed, with several developers suggesting that it be combined with the Newsletter as a regular feature. Respondents who rated the Abstracts as "not useful" said they didn't need such a service because they review RIE and CIJE regularly.

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[4] The sponsors may enjoy a surfeit of current information such as that contained in the Newsletter and thus may not see much value in the Newsletter serving their information needs.

Cost Estimates. The cost of publishing either the Newsletter or the Abstracts will depend greatly on the accessibility of information, since most of the cost is associated with securing, selecting, and preparing copy, rather than with reproduction and mailing. If the Newsletter is to be current and broadly based, its editor(s) will have to actively seek out information from a wide variety of sources.

Experience in preparing three issues of the Newsletter suggests that approximately five days of professional "editor" time are required for correspondence, telephoning, writing, and editing an issue. Another two to three days of clerical time are required for typing, proofing, addressing, updating mailing lists, etc.

Preparation of the Abstracts may require two to three days of professional time on searching and selecting items and on writing or rewriting item annotations. The user study information clearly indicates the need for "rewriting" abstracts to highlight personnel and training implications.

The major (in roughly descending order of cost) variables are: (1) the number of issues per year, (2) the "quality" of information (how recent, how useful, how well selected, how well edited), (3) the number of copies per issue, (4) the number of pages per issue. These are based on the assumption that the Newsletter would have a format similar to the three pilot test issues, with a run of 250 to 1,000 copies.

Applying Far West Laboratory salary, benefits, and G&A (overhead), we arrive at an estimate of approximately $500 to $800 per issue. This estimate includes all costs to the point of camera-ready copy for a six-to-eight page, "high quality information content" issue. Since reproduction and mailing costs may run between 20 and 30 cents per copy,[5] a mailing of 400 copies per issue may add less than $100 to the cost per issue. How many copies would be needed? Our rough guess is that 50 copies (bulk to NIE address) for NIE staff, 50 copies for sponsored performers, 200 copies for training program directors, and 100 copies for R&D employer organizations would constitute the initial mailing of 400. This mailing list will grow, but, if controlled, it might be kept under 1,000 "key" recipients. The cost for reproduction and mailing might then be estimated at approximately $250 per issue.[6] If the Abstracts is included in the Newsletter (estimated at two to six more pages per quarterly or bimonthly issue), approximately $250 to $350 should be added to the cost per issue and three to five cents per copy, to the mailing cost.

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[5] First class mailing at 8¢ per item may be advisable. Third class mailing requires a third class permit at annual cost of $30.00, a one time $15.00 permit to imprint, and a 4.8¢ per piece rate if maximum weight per item is just under three ounces. Mailings would have to exceed 1500 items in the first year (e.g., six issues mailed to a list of 250 addresses) to beat the first class rate. If multiple copies are sent to the same address, the cost may be closer to 15 to 20 cents per copy.

Given the above information, we estimate that a quarterly Newsletter plus Abstracts publication (totalling an average of 10 pages per issue), mailed to no more than 1,000 non-paying subscribers, would cost approximately $4,000. A bimonthly publication should cost less than $6,000.

It must be noted that over half the cost of publication is represented by professional news collection, writing, and editing. This portion could be cut substantially, but at the risk of losing overall quality of information content and potential utility to the reader. The choice of a well-informed, experienced, and dedicated editor is essential. "Journalism" skills are necessary, but not sufficient. The editor must know what information the various target audiences need and how to obtain and organize it for their current awareness.

2. Products

Of six products listed, two, possibly three, appear to be promising alternatives in terms of user evaluations. The top contender is a Source Book of Selected Literature, closely followed by an Instructional Materials Catalog. In third place, as a possible, is a Source Book of Case Studies.

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[6] A nominal charge of one dollar per year, payable in advance, would possibly just cover the cost of adding one addressee. Such a device may be needed to keep the mailing list within the budget.

Literature Source Book. The purpose of this item is to provide trainers, training developers, students, and RDD&E practitioners with convenient references to literature which might be useful as basic or supplementary readings on the issues, concepts, research, methodology, and actual practice of educational RDD&E.

The rationale for this product is found in the fact that both trainers and training developers report difficulty in locating instructional resources outside the more traditional "educational research" areas. A Literature Source Book could be used by trainers, students, and RDD&E practitioners to update their knowledge of what is actually happening in RDD&E. This is not such a problem for the researcher; however, the dearth of published literature with instructional value relevant to educational development, diffusion, and evaluation and allied, decision-oriented "disciplined inquiry" areas is a major problem. The state-of-the-art is neither well conceptualized nor well communicated in these areas.

The content of this Source Book would include: (1) an introductory section, describing content, suggesting uses, and providing instructions on how to obtain the references; (2) a "deep" subject index, oriented especially to instructional or self-study requirements; and (3) a file of references, complete with citations, abstracts, and evaluative annotations.

The test format was a semi-prototype. This Literature Source Book contained 36 references and abstracts, a table of contents, and an index.

In the results of the pilot test, the Literature Source Book received a weighted average of 10.41 points or third place (after the Newsletter and the Abstracts). Target groups were markedly different in their evaluation of this alternative, however. Sponsors averaged 14.43 points; researchers, 13.75; degree trainers, 9.38; non-degree trainers, 8.75; and developers, 4.29. Neither the developers nor the trainers were very specific about the uses to which they would put the Literature Source Book. They perceived it as a "nice," but not "essential" item to have. Developers commented that it could "help in a general way on a specific problem" and that it "deals with theoretical and conceptual areas of information and is generalizable." One degree trainer would use it to "find out about how people in DD&E are proceeding--developing a whole new jargon which [they] claim is different from research but may not be." Another would use it to "spur on the thinking of faculty." Nondegree trainers compared the Source Book to the Newsletter as a way to keep informed, but in a more confined content area. They considered it a "basic document," "more useful than the abstracts," and "an aid in doing [their] own research." The researchers indicated that they would use the Source Book as a starting point in defining the problem, in looking for clues to find authors and sources, and as a general source for skimming to keep current on who is writing what.

Cost estimates for the Source Book reflect the fact that the project has produced over 80 literature references and abstracts, principally based on the contents of the Oregon "Compendium." Hence, there is already a useful base for this product. Developing these items to publishable quality, including expert review and revision, and preparing camera-ready copy might cost $1,600. Our estimate is that each additional new entry would cost $75 to $100, including costs to search, acquire, screen, abstract, index, and format the draft item, submit it to at least two expert reviewers, and revise as needed.

A 200-item Source Book, complete with index, might cost approximately $11,000 to prepare for camera-ready copy. Depending on the type of reproduction and binding and the number of copies, production costs might run from $1.92 to $2.50 per copy. A thousand copies could be produced by GPO for less than $2,000.

Note that one pilot test respondent suggested that a loose leaf format for the Source Book would permit updatings, reorganization of contents, copying, etc. Such a format could increase the bulk of the Source Book, but might be worth the inconvenience to gain the advantage of flexibility. Printing costs for a loose leaf, three-hole punch format are estimated at $2.60 to $3.50 per copy. A thousand copies could be produced by GPO for less than $2,700.

Instructional Materials Catalog. The purpose of this product would be to list, describe, and evaluate selected instructional resources and materials which might be of value as resources for training programs and training development efforts.

The rationale for this product, like that of the Literature Source Book, is found in the fact that both trainers and training developers report difficulty in locating instructional materials outside the more traditional "educational research" areas (e.g., statistics, experimental methods, tests and measurements). The problem is especially serious for "thin market" items (especially those involving multiple media) which have failed to obtain a publisher, or, if published, have not received effective promotion.

The test format was a "prototype" Catalog containing 36 entries (43 entries in a later version) and an index.

Results of the pilot test show that the Instructional Materials Catalog was the fourth highest priority choice, receiving an overall weighted average of 9.02 points. Sponsors gave it an average of 11.70 points; developers, 11.43; nondegree trainers, 9.38; degree trainers, 6.50; and researchers, 6.25. Sponsors and developers rate the Catalog high as a dissemination vehicle for creating awareness of available training products. The seven developers would use it as a resource if they were "developing training" or "looking for information" about existing training materials. Trainers, on the other hand, would use the Catalog to "keep up-to-date," to help put together "inservice workshops for teachers and supervisors in schools," or to "identify" curricular materials. One developer and two trainers also indicated that the Catalog would be more useful to them if descriptions of the materials were "more evaluative" or "critical."

Estimating the cost for this product is quite difficult, simply because so much experience with the development of the ALERT system has led us to realize how expensive it can be to secure adequate, user-oriented information on any kind of educational development product. Two developers, both highly experienced with the ALERT system, independently arrived at similar cost estimates--approximately $500 per development product[7]--to obtain information of similar quality to the ALERT Sourcebook of Elementary Curricula Programs and Projects (GPO, 1972). This may set a high quality, upper limit. Assuming that any kind of independent analysis and evaluation is involved, $100 per item may be a credible lower limit. How can this very wide $100 to $500 range be explained? Much depends on the following factors: (1) how selective the collection will be, (2) how much searching will be conducted and in what areas, (3) how much analysis and evaluation will be undertaken, (4) how large the collection will be (economy of scale). If Books in Print, the NICEM Indexes, the Westinghouse Catalogue, and similar sources are used, it is not hard to find published materials. Locating unpublished materials is more difficult and finding materials not in traditional research areas is most difficult.[8]

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[7] A development product may consist of several related items. Much of the cost is associated with locating developments, corresponding with developers to obtain information, etc., which often involve similar effort whether one or more development items are involved. The per item cost should thus be somewhat lower.

[8] Guba and Gephart (1970) provide a most pertinent account of their efforts to locate fugitive training materials. Through presentations at meetings, involving 80 persons, visits to 47 institutions, and over 800 mail contacts, they identified

(cont.)

Exactly what the cost might be depends heavily on what kind of an Instructional Materials Catalog is desired. A "mix" might be desirable--with approximately 200 entries represented by a carefully evaluated selection of published texts, films, and other instructional resources and with 100 items represented by ALERT-like quality developments. Assume that all these items have been evaluated by at least two independent reviewers or qualified users. Assume, moreover, that no more than 150 of the items would be permitted in the traditional research areas. Assume, finally, that at least five experts have received the draft copy before final revision. Delivery of camera-ready copy for such a Catalog would probably cost between $75,000 to $100,000.

On the other hand, a simple listing of 300 easily located RDD&E instructional resources, with perhaps a one-paragraph description per item and a simple index, might be produced at a cost of less than $10,000. We doubt, however, that this alternative is a bargain. Most of our target group users know how to search for published materials and many are inundated by publisher brochures. These users want evaluation and critical review. They want help in identifying the "hard-to-find." They want adequate indexing, description, and analysis so they can match what's available with their needs. And they want adequate references to what is actually available. This kind of information is hard to retrieve. It costs more.

Case Study Source Book. The purpose and rationale for the Case Study Source Book are quite similar to those for the Literature Source Book, namely, to provide annotated references to selected instructional resources. Case studies represent

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8 (Cont.)

327 different items. Over three-fourths were textual materials or examinations. Less than 7% of the items (or 25 to be exact) dealt directly with development, diffusion, or evaluation processes. The proportion of DD&E materials should have increased somewhat in the intervening six years (Spring, 1967 for the first mail survey), but our own search for DD&E, as opposed to "research" (including statistics, test and measures, experimental design, sampling, etc.) materials, suggests that searching for the relatively rare and highly fugitive item can be costly.

an important resource for understanding the context and substance of RDD&E, which are often lost in the literature published in journal articles, monographs, and formal reports. Decision-oriented "disciplined inquiry" rests heavily on experience and judgment. Where this is true, "case methods" of instruction are indicated.[9]

The content of this Source Book would include: (1) an introductory section, describing content, suggesting uses, providing examples of such uses, and giving instructions on how to obtain the actual cases referenced, (2) a "deep" subject index, oriented especially to instructional or self-study requirements, and (3) a file of references complete with citation, abstract, and evaluative annotations. The test format was a semi-prototype, containing 41 references and abstracts.

In the results of the pilot test, the Case Study Source Book placed third on the list of six products and seventh on the list of 14 products and services. Receiving an overall weighted average of 6.99 points, it is most valued, as one would suspect, by the trainers and least valued by the researchers and developers. The group averages were: non-degree trainers, 9.38; degree trainers, 8.13; sponsors, 7.90; developers, 5.14; and researchers, 5.00.

The developers' uses for the Case Study Source Book differed from those of the trainers. The former thought the Source Book would have some utility when they were "looking for specific methods or materials" on RDD&E training development. Some would prefer to see case studies on training, as opposed to curriculum, development projects so they could acquire more detailed information about process and methodology. Both degree and non-degree trainers, on the other hand, perceived the Source Book as mostly useful for stimulating thinking about faculty research and for teaching courses in evaluation and educational research. Neither developers nor trainers thought they would use the Source Book regularly and frequently, but both thought they would have "some uses" for it, as indicated above. The researchers had various reactions. One considered the Source Book examples as too cryptic, only a teaser. Two researchers noted that the case studies typically were too shallow or superficial and that more effort would be needed in abstracting the substance. The Source Book should make a greater effort to spell out what the reader would or could find in the case study. Generally, the researchers, although recognizing the value for training, did not see the case studies as being especially important to them--except when examining a specific domain of activity. Then, case studies, if well done and specific, could be especially useful in showing the real world or in gaining insight into the context and process of RDD&E.

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[9] Professional training in law, business administration, and systems analysis are examples where study, analysis, and discussion of case materials are used to educate professionals for decision-oriented inquiry.

The Case Study Source Book may be a special situation as far as cost is concerned. There are 41 case studies abstracted in the prototype. Our guess is that there may be no more than another 10 or 20 case studies of comparable quality in existence at this time.[10] Moreover, there does not appear to be any likelihood of an appreciable number appearing in the near future. If this guess is correct, the existing prototype Source Book represents a substantial start toward a publishable product. The abstracts do need reworking, to indicate better what in the cases might be of use to different target audiences. Further indexing is also needed. Probably most important for actual utilization is the need to add a section describing and illustrating how the case materials might be used. A quick "clean-up" of the prototype Source Book might be accomplished for a few thousand dollars, depending on how much is attempted.

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[10] On the other hand, there are literally thousands of R&D project reports. These reports might be "mined" for possible use in developing case materials. Alternative one might attempt to stimulate the production of case studies, possibly by providing incentives to selected projects to document their history in a case study or by commissioning contractors to produce more studies such as those produced by the Oregon Studies or AIR.

A more extensive effort might deserve consideration. The scope of work could include: (1) further searching to locate at least 50 case studies, (2) development of a thesaurus of case study subject terms, (3) analysis and in-depth indexing of each of the 50 selected case studies, and (4) preparation of at least two introductory chapters, one describing the case studies and their uses in policy study, program planning, research on personnel and training, training and personnel development, etc., and the other illustrating various applications of case materials. The body of such a source book would contain approximately 100 pages of substantive abstracts of the 50 case studies. Finally, there would be an in-depth index having some of the character of a concordance, in that it would attempt to identify all selected topics and the specific location in each case study of relevant material. This kind of a product might require five to seven professional personnel months and cost between $12,000 and $15,000.

3. Query Services

Three inquiry services were separately identified: (1) Hotline/Telephone Query, (2) Mail Query, and (3) Walk-in Query. Although the three services have basically the same purpose, which is to provide immediate, individualized response to specific user queries, they differ in the mode of incoming contact with the user.

The rationale for providing these services is simply that direct response to individual users is essential if effective, cost-beneficial service is to be provided at all. The analysis of user requirements (report of the Planning Phase, Chapter III) indicates that most target groups are relatively small and that they have diverse needs for information or information referrals. For some groups (especially sponsors and performers), if the information is to have value, it must be timely and relevant. Moreover, direct contact with individual users is essential to the concept of a user-oriented information center, since direct contact will enable immediate and continuing feedback concerning the adequacy of its collection, trends in information needs and interests, and user's evaluation of services and products. It may be expected that nearly all of the query load will come over the phone or through the mail. Walk-in contacts may entail only a relatively few patrons who are either located or visiting in the Center's area or who have come for more extensive research of the Center's collection. The latter reason may become relevant if the Center develops an extensive curriculum and instructional materials collection.

The content of the Query Service is unpredictable except by extrapolation from the experience of other information centers. One of the major reasons for proposing these services is to discover what the nature of users' requests may be and what the Center's capability to respond will be. Based on the experience of several centers, approximately 75% of the requests will be filled with relatively simple reference or routine search and retrieval efforts. A significant number of queries may be met with standard response "packages" when the Center has been in existence long enough to have built a substantial inventory of such "packages." Another 20% of requests can be expected to require more extensive and costly responses because of their complexity, novelty, or demand for information not readily retrievable from any accessible source. It is estimated that approximately 5% of information requests will not be answerable because the question falls outside of the legitimate scope of the center's mission or because the information requested cannot be located (and may not exist).

Based on the experience of several ERIC Clearinghouses and consideration of upper limits on the estimated sizes of the several target groups (see Planning Report, Chapter III), 5,000 requests per year seem to be the outside limit, even for an established two- to three-year old operation. This estimate assumes that active users will, on the average, make between two and six requests per year (a going rate experienced by several centers) and also that the initial response is free (although fees may be charged for more extensive work, such as computer searches).

The test format focused on providing for both telephone hotline and mailed requests. The hotline (415/841-2501, call collect) was installed on November 13th. A toll-free INWATS line (800/227-4535) was in operation between December 14, 1972, when the Far West Laboratory moved to San Francisco, and March 30, 1973. Both the hotline and mail service were announced in the Newsletter sent to about 150 sponsors, performers, trainers, and R&D employers.

Pilot test results for the Query Services are quite mixed. On the one hand, relatively few persons actually used the services. In spite of announcment of the services to almost 200 persons, only nine callers requested formal information services and only four of their requests required extensive computer and manual searches. On the other hand, the user survey indicates that the hotline received a weighted average of 8.20 points, ranking fifth among the 14 alternatives and that the mail query received 7.39 points, ranking sixth. Degree trainers are consistently high in their priorities, allocating 21.5 of their 100 points to these two services. Sponsors, nondegree trainers, researchers, and developers follow in that order. Slightly more than half of the respondents in both trainer groups and half of the developer respondents reacted positively to the Query Service. The latter group was less clear than the trainers about how they would make use of the service, with only one specifying that it would be helpful "for developing programs--I could find models, consultants and get instant feedback." Nondegree trainers stated only that it was useful for "specifics" and for getting information "fast." Degree trainers, on the other hand, had some specific purposes in mind--"for developing a research proposal or a new program," "to answer major questions for planning and delivering instruction," to handle "official institutional inquiries about data, consultants, and planning institutional functions." Respondents in all three groups were concerned about the expense and economic feasibility of a hotline--indicating that costs would have to be "reasonable." A few nondegree trainers indicated a preference for mail over phone inquiries. Researchers were divided--two indicating that the services would be useful and two indicating they would not be useful. In general, the researchers were doubtful that the inquiry service would be able to turn up much that they didn't already know, but they might use it as some kind of check.

When asked specifically about the usefulness of a telephone query service, many users indicated either that they are not oriented toward using a telephone service for search purposes or that they prefer to do their own searches. They commented: "Most academics would dealin print, unless they want a specific title"; "I don't need information in that much of a hurry"; "No--I would search myself"; "What you need you can get without a formal connection"; "I'd be prone to call a specific person"; "I don't like the phone."

Interestingly enough, however, there were about 45 other calls logged in the record books. Many of these callers used the hotline to inquire about a pre-AERA conference on personnel and training. Some were responding to the survey of user information needs. Others wanted to contact members of the Far West Laboratory staff about field testing or use of specific products. A few were curious about progress on the pilot test.

The pilot test and user interview data clearly suggest that operation of a Query Service is a part-time job. The requests received, however, were demanding in the sense that they required a substantial knowledge of the information base and how to search it. In a couple of cases, the most useful outcome was primarily to indicate that none of several different kinds of searches had produced more than tangential retrievals and that there just did not appear to be much relevant information on the specific requests. What seems to be indicated is the following: (1) Query Services appear to be valued, especially by degree trainers and, to a slightly lesser extent, by sponsors and researchers; (2) the services would have to be promoted and would probably grow slowly as satisfied users make new requests and tell their colleagues; (3) initial query negotiation and preliminary searches could be handled by an intelligent and knowledgeable junior professional, *if* easy access to more experienced professionals is provided; (4) the searcher must have access to moderately extensive, high-quality collections and, if at all possible, to an ERIC computer search system [because of their relevant content, NTIS and PASAR (Psychological Abstracts Search and Retrieval) services should be used when indicated]; and (5) initially, the work load will be low and may never require more than a fraction of the time of one competent searcher. Moreover, the search work load may be quite variable. Consequently, the search service should be made part of a larger operation, either within NIE itself, within one of its Research Training contract projects, or an ERIC Clearinghouse.

Cost Estimates. If the Query Service is incorporated within one of the agencies listed above, it would probably represent a relatively small marginal cost. If promoted by announcements in Newsletter issues sent to 400-500 persons, the number of formal information searches might be estimated between 40 to 100 in the first year of operation, although several hundred simpler requests might be logged. Our guess is that, in the first year, between 10% and 20% of the time of one information specialist, who is supported by a budget for telephone, computer searches, and clerical services, would be required.

Given the low incidence of calls, a toll-free INWATS line, which could cost approximately $4,000 to $5,000 a year, does not seem cost-effective. A "call collect" policy may be justified, however. We estimate that the first year of this service would cost less than $6,000, including salaries, benefits, communications, computer searches, and overhead. Note, however, that this does not budget for collecting, organizing, or processing information in any form other than handling mail and telephone inquiries. It is simply an "add-on" cost.

C. Summary

Table 5 below summarizes the "cost preference" data on the estimates presented in the previous section. The first three options listed in Table 2 can be combined into a single, relatively inexpensive package of related announcement and current awareness services. This package accounted for over 40% of the priority point allocations made by the pilot test users.[11] The cost of this package is estimated at $10,000 to $12,000 for the first year. Second-year costs would probably run $12,000 to $15,000, on the assumption that some increase in volume of service would occur. Quality service at this cost will be obtained, however, only if the work is accomplished as part of a larger, related personnel and training R&D activity.

All three remaining products emerge as possible contenders for next consideration. There appears to be some possibility of producing a companion pair of source books, one dealing with the literature and the other with case studies. The price for the pair might be between $15,000 and $25,000, if the scope of work required is modest.

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[11] Developers allocated 50 points; degree trainers, 44; researchers, 42; nondegree trainers, 39; and sponsors, 33.

TABLE 5

COST-PREFERENCE DATA ON PROMISING DISSEMINATION ALTERNATIVES

Dissemination Alternatives	Weighted Priority	Cost Estimate (See text for details)
1. Hotline and Mail Query Service	15.59	$6,000 first year
2. Newsletter	14.05	$3,000 to $4,500
3. Abstracts	12.15	$1,000 to $1,500 (if inserted in Newsletter)
4. Literature Source Book	10.41	$12,000 to $17,000
5. Instructional Materials Catalog	9.02	$10,000 to $100,000
6. Case Study Source Book	6.99	$3,000 to $15,000

In our personal view, the potential value of the Instructional Materials Catalog has been much underrated, possibly because many respondents may have considered it in terms of how often they might consult it or how the information in it might be of immediate use to them. In our view, the true potential of such a catalog will be achieved and perceived only if it is developed and given appropriate dissemination as a tool for creating awareness and facilitating access to new or inaccessible instructional resources in priority training content areas. Unfortunately, such a catalog may carry a relatively high price tag. A simple compilation of lists of available instructional materials could be developed at a much lower cost, but would probably have marginal utility for any of the target audiences.

A brief analysis of costs for the next two priority dissemination alternatives --Meeting/Conference Support and Walk-in Query Service--may help to place the above conclusions in perspective.

Support Conference and Meetings. The pilot test involved two conferences: a 1973 pre-AERA session and a meeting in Columbus, Ohio, in December 1972.[12] This alternative received an average allocation of 5.78 points, or eighth place, with notable endorsement by researchers and trainers. The target user interview results were not very positive, either--"sometimes useful/sometimes not," "money spent could be put to better use," "expensive and no payoff," "a waste of time," etc. Some users did suggest, however, that focused conferences, organized on a regional or problem-centered basis, might be a useful communication procedure. These low ratings were nonetheless surprising, since both the Columbus and the 1973 AERA pre-session meetings were well attended and received quite favorable evaluations from those participating. Although the user data are unimpressive, the results of the two pilot test conferences were quite positive. The fact that over 100 persons chose to attend these two conferences on their own time and on their own project/agency budgets is impressive evidence of their worth. If the conference is user-problem-focused and well planned and if users are prepared in advance, then conferences can be quite successful. If carefully organized, the conference can be a cost effective alternative. Our experience with the Columbus and 1973 AERA pre-session conferences indicated that these types of meetings can be organized for approximately $1,200 to $1,500 each, if users pay their own expenses.

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[12] Further information on these conferences and their evaluation can be found in Nancy McCutchan's final report, "Management Development for Internship Training Programs in Educational Research, Development, Dissemination, and Evaluation," August, 1973.

Walk-in Query Service. This would require a center which a person could visit, consult with knowledgeable technical personnel, and search an information and instructional materials collection. This option received a weighted average of 5.76 points, ranking ninth on the list of 14 alternatives. The walk-in center could be easily part of the "package" discussed above. A subsidiary collection of suitable materials might be priced at $1,000 to $2,000 annually. If supported for several years, it could, with careful selection, lead to a valuable collection.

IV TARGET GROUP PRIORITIES

The two previous chapters have summarized data obtained from representatives of several target groups regarding their perceptions of priorities for information content, purposes for seeking information, and the kind of products and services they most valued. This chapter examines their perceptions of the relative priorities this project should observe for serving the information needs of the target subgroups. Whom to serve and with what priority were early concerns of the project staff.

It seemed unreasonable that all target groups would be of equal priority. Indeed, in preliminary pilot tests, NIE staff had allocated over three-fourths of their priority points to only three of the six major target audiences. These three groups were sponsors, performers, and trainers. Given this information, the project decided to focus further field test data gathering on these three major groups; however, because of its large size, as well as possible differences between programs, the trainer group was divided into two separate samples--degree trainer and nondegree trainer. Similarly, in the performer group, researchers and developers were also analyzed separately because of possible differences.

Because NIE personnel expressed concern that their perceptions of target group priorities might not be similar to those of other target groups, respondents in each of the five groups (sponsors, researchers, developers, degree trainers and nondegree trainers) were asked to allocate 100 points to show relative priorities for providing eduational RDD&E personnel and training information system service to each of sixteen subgroups. The averages for the five groups and the overall weighted averages are presented in Table 6.

TABLE 6

SAMPLE GROUP ALLOCATION OF 100 POINTS IN TERMS OF PRIORITY FOR TARGET SUB-GROUPS

Groups	Subgroups	Sponsors	Researchers	Developers	Degree Trainers	Nondegree Trainers	Overall Weighted
Sponsors	1. Planners	7.25	11.25	13.29	11.83	8.75	10.49
	2. Managers	8.50	8.00	3.76	5.63	3.75	6.17
	3. Evaluators	5.75	8.00	7.79	7.54	5.25	6.95
							[23.61*]
Performers	4. Researchers	7.75	10.50	9.46	11.11	10.13	9.74
	5. Model Developers	10.50	7.50	10.05	6.59	9.00	8.71
	6. Materials Developers . . .	10.25	11.75	7.29	6.34	8.50	8.91
							[27.36*]
Trainers	7. Degree Program Directors .	10.00	13.25	9.90	7.94	6.88	9.80
	8. Degree Instructors	8.25	5.75	7.69	8.71	6.13	7.39
	9. Nondegree Instructors . .	9.25	5.75	7.05	5.17	4.25	6.47
							[23.66*]
Students	10. Preservice	2.25	1.00	1.51	2.20	4.63	2.16
	11. Interns	1.75	1.75	3.26	3.54	4.13	2.77
	12. Inservice (on-the-job) . .	3.25	2.25	3.75	5.54	4.25	3.76
							[8.69*]
Employers	13. R&D Agencies	6.00	3.25	4.26	4.43	5.88	4.71
	14. Other RDD&E Employers . .	3.50	1.75	3.01	2.29	4.38	2.89
							[7.60*]
Practitioners	15. State Educational Agencies	3.50	4.25	3.26	6.29	6.38	4.62
	16. Local Educational Agencies	2.25	4.00	3.79	4.86	4.63	3.83
	17. Other	0.00	0.00	0.38	0.00	3.75	0.61
							[9.06*]
	Total	100.00	100.00	99.50	100.01	100.67	99.98
	Number of Cases	N=4	N=4	N=8	N=7	N=8	N=31
	Percent Usable Returns	80%	80%	89%	78%	89%	84%

* Sum of overall weighted priorities for subgroups.

The numbers appearing under the headings of sponsors, researchers, developers, degree trainers, and nondegree trainers represent averages based on responses from 4, 4, 8, 7, and 8 persons respectively. The percentage of usable returns is good and, although these samples are small, they are representative. The averages suggest there is substantial but not complete agreement among the priorities of the five groups. This impression was confirmed when the averages within each column were rank ordered and rank order correlations were computed. See Table 7. (Only the 16 specified subcategories have been used to compute rank order correlations.) All correlations are significant at the .05 level. In other words, rank ordered average priorities for the five groups agree beyond chance levels.

TABLE 7

RANK ORDER CORRELATIONS AMONG FOUR TARGET SAMPLES REGARDING RELATIVE PRIORITY ASSIGNED TO SIXTEEN SUBGROUPS WHO MIGHT BE SERVED BY AN RDD&E PERSONNEL AND TRAINING INFORMATION SERVICE

GROUP	Sponsors	Researchers	Developers	Degree Trainers	Nondegree Trainers
Sponsors..........		.77	.70	.57	.51
Researchers.......	.77		.82	.84	.62
Developers........	.70	.82		.85	.74
Degree Trainers...	.57	.84	.85		.74
Nondegree Trainers	.51	.62	.74	.74	

Sponsors most agree with researchers, then developers, degree trainers and finally nondegree trainers. The largest rank order differences between sponsors and researchers are found in their relative priorities for "model developers," "nondegree instructors," "evaluators," and "planners";[13] sponsors place greater emphasis than researchers on "model developers" and "nondegree instructors" and less emphasis on their own subgroups of "planners" and "evaluators." The largest differences between sponsors and developers are found in their relative priorities for "planners" and "managers." This may reflect a different interpretation of the labels. Developers place a much higher priority on "planners" and a much lower priority on "managers" than do sponsors.

Sponsors and degree trainers are most discrepant on priorities for "planners" and "nondegree trainers." Degree trainers, like the researchers and developers, give "planners" a high priority, while the sponsor groups assign "planners" a middle value. Degree trainers (and nondegree trainers!) assign a relatively much lower priority to the "nondegree trainer" group. Nondegree trainers, like the developers, attach relatively little value to "managers." These major discrepancies between sponsors and nondegree trainers (in which nondegree trainers tend to assign much lower priorities to "managers" and to themselves) account for the relatively low rank order correlation of .51.

The priorities of researchers are most like those of developers and degree trainers and least like those of nondegree trainers. The relative priorities differ most in priorities allocated "managers," "model developers"

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[13] To reduce the confusion between labels for groups assigning and receiving priorities, the receiving group label has been placed in quotation marks.

Researchers place a much higher priority than developers on serving information needs of "managers" and "material developers," while developers place relatively greater emphasis on serving needs of "model developers." Researchers differ most from degree trainers in placing relatively greater priority on serving "materials developers " and lesser emphasis on serving "degree instructors." The major differences between researchers and nondegree trainers is in the latter group's lack of priority for "managers," and to a lesser extent in nondegree trainer's relatively greater priority for "model developers" and "preservice students."

The correlations between the developers and both groups of trainers are substantial. Between developers and degree trainers, there are relatively few important differences. In terms of rank orders, the largest difference is in the relative importance of "state educational agencies"; in terms of point averages, it is in the importance of "model developers." Degree trainers place relatively less importance on serving "model developers" and relatively more importance on serving "state educational agencies" than do developers.

In terms of rank order differences, developers and nondegree trainers are most discrepant in the relative value attached to "nondegree trainers." Strangely, developers attach much more importance to serving this group than do representatives of this group. Nondegree trainers (like degree trainers attach more importance than developers to serving "state educational agencies." In average points, the largest difference between developers and nondegree trainers is in the importance of serving "planners."

Finally, the two trainer groups differ most, in rank orders, on the realtive importance of serving "managers"; in points, on serving "planners" and "others."

In spite of these various differences, it is important to realize there is substantial agreement among these groups. Therefore, it seems reasonable to assume that averaging the data for the five groups would lead to a more satisfactory estimate of priorities, because it is based on a larger number of cases, than would using the data on any one group alone. However, unweighted averages were not computed. Instead, the priority data itself was used to compute, by iteration, a weight to be assigned to the allocations made by each sample group. The procedure has been detailed in a previous report. After several iterations, the computed weights stabilized with the following rescaled values (to equal 1.000): sponsors .231, researchers .217, developers .195, degree trainers .214, and nondegree trainers .143. Developers, researchers, and degree trainers are assigned weights very close to those they would have if all groups were treated equally (.200); sponsors receive a relatively higher weight and nondegree trainers, a much lower weight. These weights are used in computing the _weighted_ averages reported in the tables in Chapters II and III.

With this explanation of how weighted priorities were derived, the reader should return to Table 6 and examine the last column, at right which indicates the weighted priorities for the 17 subgroups, and shows the sum of weighted priorities for subgroups comprising the group.

A note of caution: If students, employers, and practitioners had been included as sampled groups in the study, the final set of weights would be different, probably attaching more importance to serving such groups. The differences might not be great. Note, for instance, that the nondegree trainers assigned a lower weight to serving their own group than did sponsors, developers, or degree trainers. However, as we scan from left to right across Table 6, from sponsor to nondegree trainer, a distinct trend in assignment of priorities to groups _other than_ sponsors, performers, and trainers can be observed. These are the total priorities assigned to these other groups: for sponsors, 22.5%; for researchers, 18.2%; for developers, 23.2%; for degree trainers, 29.2%; and for nondegree trainers, 38.0%. The differences are small, but there is a suggestion trainers are more "practice-oriented" than sponsors, researchers, or developers.

Related evidence can be found in Table 7. The rank order correlations in this table display a _simplex_ pattern in which the highest correlations are found closest to the diagonal. This kind of pattern occurs when variables are arranged so that those most highly correlated with each other are placed next to each other in the matrix and those with lower correlations are placed correspondingly further away (e.g., sponsors correlate least with, and are farthest apart from, nondegree trainers in their row and column arrangement). The point is that Table 7 was not _artificially_ rearranged to create this pattern. Rather it arises from the order in which the target groups were listed.* It is our hypothesis that, if data were collected from all possible groups, a simplex pattern of correlations could be created and it might require little or no reordering of groups on Table 6. Stated another way, we are guessing that the perceptions of priorities of employers, for instance, would be more like those of the students and practitioners, to whom they are adjacent on the list in Table 6, and least like those of the sponsors and performers, from whom they are the most distant on the listing. This guesswork suggests that, _if_ NIE is satisfied that sponsors, performers, and trainers are the major groups to be served (the data in Table 6 indicate this), _then_ the present data will be quite useful in providing guidance for the design of an information system. However, if, for some reason, much greater importance should be attached to providing, say primarily employers and practitioners with personnel and training information, then the results of this particular user study _might_ be misleading.

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*The order of listing was based on an _a priori_ model of similarity of information need.

Summary analysis. Five different groups were sampled. Representatives of each target group were asked for their perceptions of the priority that should be attached to serving the possibly different needs of various groups. The five groups were generally in agreement regarding priorities, although they displayed some difference. Overall, they assigned three-fourths of their priority points to the three major target groups: sponsors, performers, and trainers. The students, employer, and practitioners were not totally disregarded but their perceived significance was much smaller. Performers, sponsors, and trainers received approximately equal priority and overall weighted priorities for subgroups within these groups do not differ greatly. Table 8 displays the subgroups rank ordered for overall weighted priorities.

TABLE 8

TARGET SUBGROUPS RANK ORDERED BY OVERALL WEIGHTED PRIORITY

Subgroups	Priority Weighted
1. Planners (sponsors)............	10.49
2. Degree Program Directors.......	9.80
3. Researchers....................	9.74
4. Materials Developers...........	8.91
5. Model Developers...............	8.71
6. Degree Instructors.............	7.39
7. Evaluators.....................	6.95
8. Nondegree Instructors..........	6.47
9. Managers (sponsors)............	6.17
10. R&D agencies (employers).......	4.71
11. State Educational Agencies.....	4.62
12. Local Educational Agencies.....	3.83
13. Inservice (on-the-job) students	3.76
14. Other RDD&E employers..........	2.89
15. Interns (students).............	2.77
16. Preservice students............	2.16
17. Others.........................	0.61
Total.....	99.98

V. AN RDD&E PERSONNEL AND TRAINING COLLECTION

A. Introduction

The two previous chapters summarize project findings regarding users' needs. This chapter focuses on the organization and content of the information that may be provided. There are two major sections. The first describes project experience with indexing and classifying an experimental educational RDD&E personnel and training collection. The second section summarizes findings, reported at length in another document, regarding the quantity and character of RDD&E content.

Chapter IV of the Report of the Planning Phase had outlined an information system model which dealt with nodes (originators, processors, and users) functions (collection, processing, etc.) and information flow (characterized by content, subject orientation, format, levels of formalization, accessibility, etc.). The relative advantages and disadvantages of informal, semiformal, and formal communication were examined. The formats of RDD&E information were located in a matrix based on their classification by structural form and by levels of formalization. Finally a preliminary scheme for classification by information content and subject orientation was outlined.

B. Indexing and Classification Experiment

Over 1,000 items were collected and classified by the project. After reviewing alternatives, the project recommended that NIE consider an "ERIC-like" system in which surrogates, including both citations and abstracts are created. These should be deeply indexed (i.e. with 8 to 12 terms) by standard ERIC thesaurus terms so the collection would be fully compatible with the ERIC collection. Search of such a system would thus be quite similar to a manual search of ERIC. One would first look up the ERIC term in an index and locate the document number, then locate the citation and abstract in a looseleaf notebook, decide if the item seemed relevant, and if so, locate the physical item. This idea was tested by creating a collection of over 200 citations and abstracts of significant RDD&E literature which were indexed and organized as a looseleaf catalogue of annotated literature. We found it advantageous to use a looseleaf format with only one item to a page, and to reproduce several copies. This enabled us to maintain one serial order copy, which could be used when searching by thesaurus terms, while arranging other copies to facilitate browsing by subject interest (e.g., if an item dealt with research and evaluation, the abstract could be placed with the research abstracts and also with the evaluation abstracts). These browsable collections of abstracts are recommended as one possible way to increase access to, and retrieval of, the most significant RDD&E literature. The cost of deep indexing and abstract preparation (if abstracts cannot be found in ERIC or other sources) is substantial and seems warranted only if a small collection of high quality documents is desired. Note, however, that lesser quality documents can be handled by entering only the citation and indexing under only a few key terms. As a byproduct of this experiment, the project published Educational RDD&E Personnel and Training Abstracts, a looseleaf collection of over 200 abstracts of significant RDD&E literature.

After considering several arrangements for classifying and physically storing items, we opted for a "browsable" collection with items organized by the classification scheme reported in Appendix C of the Report of the Planning Phase (Hood, McCutchan, Aldrich, and Wolf, 1972). This scheme recognized four major categories: (1) books, papers, and reports; (2) instructional materials; (3) personnel supply and demand information, and

(4) other personnel and training information (e.g., directories, program descriptions, etc.). A fifth category consists of bibliographic references, ERIC, and the serials collection. Materials are arranged within these categories by subject matter headings (e.g., methodology, theoretical and conceptual issues) or information types (e.g., case studies, bibliographies, assessment instruments). The classification scheme is not technically elegant, and is probably inconsistent with any major classification system. But, given the very important assumptions that the collection was to serve as a reference core for an information center rather than as an archival library and that only a few thousand items would be maintained, the major virtue of the proposed approach is its practicality. Our pilot test searches were usually confined to one or at most two categories. Within these major categories, the number of items under a subject heading (e.g., "Research Methodology" or "Policy, Roles and Strategies--Diffusion) proved to be so small that browsing or searching all items, or reshelving items was not difficult. It was also easy to instruct visitors on how the collection was organized so they could search or browse for themselves. To some extent, mainly because of the small size of the collection, we have taken an experimental attitude toward the classification problem. Our view is that materials need to be arranged in ways that will facilitate retrieval of information (or instructional resources). When one is looking for information, as opposed to looking for specific documents, it helps to find items with similar content located together. Obviously, items may be grouped in many ways and classified under several possible headings. We tended to resolve these dilemmas by putting items where we thought they would have most value if a person were searching under that heading. The problem of multiple classification can be handled by

arranging multiple copies of the Abstracts into browsable folders by subject headings. If these folders are shelved under their headings, they provide the browser with a quick overview of (a) what is on the shelf, (b) what is on shelves elsewhere, or (c) what should be on the shelves but may be in circulation.

At the termination of the project, we are still experimenting with ideas for subject headings. We have learned that one must work with the collection for some time to find the groupings that best facilitate search and retrieval of the kinds of information that are most frequently sought. Fortunately, the experimental collection was sufficiently small that minor refinement or even major rearrangement is not an arduous task. Possibly the most tedious part is simply revising the "call numbers" in the abstract notebooks. We seriously doubt that our experimental classification system would accommodate a collection much larger than a few thousand items. It obviously assumes that the collection is not to be merged with a larger library collection. It places a premium on physical browsing and search for information or content within documents or other materials rather than search for the document or the materials per se.

We have encountered the need for some auxiliary index terms to provide differentiations not provided by the ERIC thesaurus. This lack can be a problem in a content area such as "development." But auxiliary terms or codes are needed especially for instructional materials to indicate more accurately the medium*, relevant target audiences, level of difficulty, etc. Currently the problem is not serious, since the number of instructional materials other than books within any one subject category is not too large to permit direct inspection. Auxiliary terms or codes would save this extra work which all too frequently leads to the finding that the available materials are inappropriate. We note that the published Abstracts list only the standard ERIC terms.

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*Several media classification systems exist. We believe that Lamy-Rousseau's (1972) may be one of the best in terms of complete specification for nonbook materials.

C. The Quantitative Content of RDD&E Literature and Instructional Materials

This section summarizes information which has been provided in a separate report titled The Domain of R&D Training Resources. The project's experimental collection was considered too small to provide reliable estimates of the total content of literature and other materials that would conceivably be germane to users'needs. Several larger information bases including ERIC, Subject Guide to Books in Print, and three instructional materials collections were examined to develop more reliable estimates of the quantities of materials available within subject content categories.

Examination of these data bases and review of the literature on documentation suggests that ninety percent of the educational R&D resources are largely informal and fugitive. Perhaps ten percent reach a semiformal level where they may be in published form and may be referenced. Possibly only one or two percent achieve "hard-cover" commercial publication and much less than one percent are subjected to the test of the R&D development cycle. Probably over 95 percent of all instructional materials is in printed form. The number of fully developed and tested materials is probably much less than 100 items; perhaps 1,000 have undergone minimal development and may be generally accessible although not necessarily easily so. And there are possibly 10,000 books and textbooks which bear on R&D training content as defined by the project. ERIC documentation suggests there are more than 40,000 relatively recent (1966-1972) journal articles and reports which provide-the knowledge base for R&D training content. The total relevant published literature may be closer to 100,000 items.

There are significant but far from perfect content correlations among the three data bases. ERIC descriptor counts prove to be better predictors of counts of nonbook instructional materials subject categories than do count of Books in Print. Almost all the instructional materials are located in classical "educational research categories," with only three of eleven major content categories containing over half of the books and textbooks and over forty percent of the nonbook instructional materials. By contrast only four percent of all instructional materials were classified in the two general content categories of (a) Design and Development and (b) Evaluation. However, examination of trends in ERIC as well as other evidence, suggests that the rate of growth may be greater in these less well-established but high interest areas.

Table 9 reports comparison counts in three categories: (1) nonbook instructional materials, (2) books and monographs, and (3) ERIC journal articles and other ERIC documents. The ERIC counts are estimates based on counts of ERIC descriptor usage. Books and nonbook counts are counts of actual titles. All counts are considered to be conservative underestimates. The Domain of R&D Training Resoruces should be consulted for definitions of subject content categories, mehtods of making estimates, etc. The content counts are useful in indicating the relative quantities of materials available in different subject content categories.

TABLE 9

COMPARISON OF CONTENT COUNTS IN THREE INFORMATION BASES

Subject Content Category	Instructional Materials				ERIC Journals & Other Documents	
	Nonbooks		Books			
	No.	Percent	No.	Percent	No.	Percent
1. Policy, Planning, Change, Innovation	79	10.7	738	10.7	3280	8.2
2. Research	71	9.6	791	11.5	3920	9.8
3. Design and Development	44	6.0	82	1.2	2800	7.0
4. Dissemination and Communication	29	3.9	316	4.6	920	2.3
5. Evaluation	40	5.4	109	1.6	3240	8.1
Subtotal	263	35.6	2036	29.6	14160	35.4
6. Science and Technology	5	0.7	49	0.7	600	1.5
7. Data Analysis, Statistics, Other Analyses	139	18.9	1127	16.4	2440	6.1
8. Objectives and Criteria	62	8.4	147	2.1	800	2.0
9. Tests, Measurement, Data Collection Instruments	65	8.8	617	9.0	5760	14.4
10. Methodology, Technique, Theory	79	10.7	1406	20.4	6560	16.4
Subtotal	350	47.5	3346	48.6	16160	40.4
11. Disciplines and Specialties	11	1.5	614	8.9	520	1.3
12. Skills, Training, Professional Education	28	3.8	169	2.5	2480	6.2
13. Personnel	5	0.7	280	4.1	2240	5.6
14. Content and Media	80	10.9	435	6.3	4400	11.0
Subtotal	124	16.9	1498	21.8	9640	24.1
Total	737	100.0	6880	100.0	39960	99.9

Table 10 below displays only the instructional materials data, reorganized in descending rank order by books counts, and excluding three categories listed in the previous table which pertains primarily to personnel and training information *per se* rather than to instructional content.

TABLE 10

COUNTS FOR ELEVEN R&D SUBJECT MATTER CONTENT CATEGORIES
FOR BOOK AND NONBOOK INSTRUCTIONAL MATERIALS

Content Category	Nonbooks		Books	
	Count	Percent	Count	Percent
Methodology, Technique, Theory	79	11.4	1406	24.2
Data Analysis, Statistics, Other Analyses.	139	20.0	1127	19.4
Research	71	10.2	791	13.6
Policy, Planning, Change, Innovation . . .	79	11.4	738	12.7
Tests, Measurement, Data Collection Instru.	65	9.4	617	10.6
Content and Media	80	11.5	437	7.5
Dissemination and Communication	29	4.2	316	5.4
Objectives and Criteria	62	8.9	147	2.5
Evaluation	40	5.8	109	1.9
Design and Development	44	6.3	82	1.4
Science and Technology	5	0.7	49	0.8
Totals	693	99.8	5819	100.0

This table affords a rough estimate of the relative quantities of materials available. The rank order of counts for books and nonbook materials are quite similar (the rank order correlation is .81). The top five categories account for 80 percent of the books and 62 percent of the nonbook instructional materials. These categories are well-established, traditional, educational research areas. By contrast the three "DD&E" areas ("dissemination and communication," "design and development," and "evaluation" account for less than nine percent of the books and only sixteen percent of the nonbook materials.

To obtain an estimate of the formats for nonbook materials, we classified 317 "RDD&E relevant" items found in Resources for Performance-Based Education (Houston, et al., 1973). These results are reported in Table 11.

TABLE 11

FORMATS OF R&D RELEVANT TITLES IN
PERFORMANCE-BASED EDUCATION

Format	No.	Percent
Instructional modules	134	42.3
Kits, multimedia packages.	59	18.6
Films and film books	47	14.8
Slides, tapes and filmstrips	44	13.9
Videotapes	12	3.8
Audio tapes	8	2.5
Programmed texts	7	2.2
Games and Simulations	6	1.9
Total	317	100.0

These studies of content indicate there is a very large base of published literature which constitutes the foundation for the content of educational RDD&E. Well-established content areas contain relatively large numbers of books, but newer areas such as "evaluation" or "product development methodology" are much less well represented, either in journal or book form. Instructional materials, other than books, are relatively hard to find. Our searchers suggest that fewer than 1,000 truly useful items may exist. Given the differences in the estimated sizes of these resource population (i.e., approxiamtely 1,000 nonbook instructional materials, 10,000 books, and 100,000 journal articles and reports) substantially different strategies are required if a user-oriented collection is desired. This problem is treated in the next chapter.

VI. Evaluation of RDD&E Materials

A. Introduction

Initially, the project aimed to investigate alternatives and make recommendations for the evaluation of information and materials to be included in the proposed personnel and training information system. Appendix D of the Report of the Planning Phase (September, 1972) briefly explained four types of evaluation: (1) selection of items for input, (2) evaluation of materials to determine the appropriate category for analysis and category for dissemination, (3) day-to-day formative and quality control evaluation of services and products, and (4) overall evaluation of the system through preestablished feedback mechanisms.

Later in the project, the interest of the sponsor shifted primarily to the evaluation of instructional materials. This subject was examined in depth and a report was prepared titled Evaluation of Instructional Materials for Educational RDD&E Content Areas (Hood, July 1973). The content of that report is summarized in the next section.

B. Evaluation of Instructional Materials

At least six different purposes for evaluating instructional materials were identified, namely: (1) selecting items for accession, (2) selecting items for indexing and abstracting, (3) purging obsolete, low value and duplicative items, (4) selecting and critically evaluating items for selective dissemination, (5) selecting, evaluating, and analyzing items for an instructional materials catalogue, and (6) selecting and evaluating items for intensive dissemination/promotion.

Acquisition, Indexing, and Purging

The first three evaluation purposes, initial selection for acquisition, evaluation for retention, and purging are directly related. They have the general goal of controlling the cost and size of a collection and of maintaining the quality of its information. With the exception of the case of a comprehensive instructional materials center, whose mission would be to compile an exhaustive collection of all instructional materials in educational RDD&E or related areas, any other collection will probably be selective with its acquisitions and guided by the requirements of its actual or potential user populations and by the limitations of its budget.

Acquisition Policy. As this design project has noted in Chapter II, the needs and requirements of various RDD&E personnel and training user populations are quite diverse. Defining priorities with respect to user populations and their needs is essential in order to provide general guidance; but, in practice, the ultimate responsibility for selecting and acquiring materials will rest on the judgments of one or a few professionals. This judgment can and should be guided by an explicit acquisition policy. Issues to be considered in developing such a policy include the following:

- What is the primary purpose of the instructional materials collection?
- Is it to be comprehensive or selective?
- Will it reflect more what is available (archival-oriented) or what users need (service-oriented)?
- Will it focus on readily available materials, fugitive materials or both?
- Will it attempt to include incomplete materials, e.g., prototypes still under development?

- Will it have priorities with respect to specific content emphases (e.g., actively searching for materials in designated priority areas)?
- Will it have special media priorities (e.g., attempt to build relatively large audiovisual or game-and-simulation collections)?
- To what extent will self-instructional or other "learner active" materials be sought in preference to the more conventional published textbooks?
- To what extent will the collection be open to general staff or outside visitor use (accessibility of the collection and relates to wear and tear, loss, and the frequency of reshelving)?
- To what extent will circulation or interlibrary loan be permitted?
- How will the collection be related to other existing collections, say NIE library or a personnel and training document collection (such ties will entail a need to duplicate copies, to correlate indexing, etc.)?
- Which training needs have what priority? For example do undergraduate needs have priority over the needs of graduates. And which of these needs shall be given priority: preservice vs. inservice; part-time vs. full-time R&D practitioners; established, high-demand content areas (e.g., research methodology) vs. emergent, low-demand content areas (e.g., formative evaluation, R&D policy formulation)?

- To what extent will an attempt be made to make the collection proactive (i.e., able to anticipate future needs and represent the best or possibly all that is available in areas where there is only a predicted as opposed to an empirically established user need)?
- To what extent will the collection be delimited to core "disciplined inquiry" vs. peripheral content areas (e.g., where does educational RDD&E content merge over into other educational professional training content or noneducational R&D training content)?
- To what extent will the collection focus on quality vs. quantity, i.e., having only the best as opposed to having everything available in any specified content area?
- To what extent will older materials or earlier versions of materials be retired in favor of new or revised versions?
- What emphasis will be placed on retaining materials for historical value?

Once questions such as the above have been answered and an explicit acquisition policy has been formulated, actual acquisition of instructional materials may be started with at least some assurance that the collection will be established and maintained according to a systematic plan.

Indexing. Because we anticipate that not every item acquired will contain relevant content or be of adequate quality, instructional materials acquired should be fully processed and indexed only if they constitute a valuable contribution to the collection and its potential for meeting users' needs. The aim in screening after accession is to reduce processing and collection maintenance costs, but more importantly to eliminate poor and inappropriate items.

Purging. Purging instructional materials collection of outdated, inefficient, and irrelevant materials is possibly one of the most needed, but least well-performed functions for most instructional materials collections. Unless the collection acquisition policy places great emphasis on its archival function (usually at a risk of not serving current users' needs well) there will be a need to periodically review the collection and purge it of its less valuable items.

Whether considering an item for accession, for indexing or abstracting, or for discard, essentially the same judgmental process and criteria are required. The basic question is how does placing (or removing) this item affect the overall value of the collection and the costs of maintaining it?

Recommendations

The need for high standards in selecting instructional materials is not fundamentally different from a similar need during documentary accession. The creation and maintenance of a collection of the best instructional materials available in each pertinent subject field should be a basic objective. This selection should be done systematically, keeping in mind the broad purposes of disciplined inquiry in education as well as the specific interest and current priorities of particular user groups.

Possibly the best advice we can give with respect to criteria for developing and maintaining a collection is that, at least initially, the collection should aim at quality rather than comprehensiveness and, within each subject category, it should attempt to secure the best materials obtainable. The acquisition policy should be proactive and it should have priorities. Search and acquisition should be especially active in areas where critical needs exist or can be projected. This may mean setting lower quality standards in these priority areas and in making special efforts to search out materials that are still in development. For example, if continuing education is considered more important than preservice education, then emphasis should be placed on acquisition of self-instructional materials

In short, we recommend that the collection be responsive to user needs and policy requirements. It should not be merely a passive reflection of what is conveniently available. Our statistical estimates of quantities of instructional materials accessible in different content areas indicate that if the latter policy is followed, the great bulk of the collection will deal with research, experimental design, statistics, tests and measures and other well-established content areas. Only a small part of the collection would deal with policy, evaluation, development, dissemination or similar content areas. A policy of priorities seems justified at least until one can be satisfied that reasonably adequate subcollections exist for all priority areas. When this is accomplished, and if the budget and resources are available, then larger subcollections of the "easy-to-collect" content areas might be undertaken. We see little gain in having a very large collection that is representative of what is available if such a collection does not effectively meet current and projected user and sponsor needs.

Evaluation of Insturctional Materials for Dissemination

This part deals directly with evaluation problems, issues, and recommendations as they relate to the creation of an instructional materials dissemination effort. The first section of this part deals with the overall purpose of such an effort, the problems of selecting a set of items and the relevant "costs" and "utilities". The second section discusses four evaluation approaches which, because of their different purposes, require different decision models. The final section contains practical recommendations for the alternative evaluation approaches.

1. Costs and Utilities in Creating a List of Selected Instructional Materials

At least two significantly different evaluation problems can occur in the creation of an instructional materials catalogue or other dissemination effort. The more obvious concern is how to evaluate each item of instructional material. In our view, the less obvious but more critical evaluation problem concerns how to evaluate the alternative forms and uses of the total effort (catalogue, list of recommended materials, etc.) These two kinds of evaluation problems interact, but it seems wiser to consider the total effort problem before considering the problem of evaluating specific, individual instructional materials.

Whether selecting, analyzing, or critically evaluating items for dissemination (current awareness), for a catalogue, or for intensive dissemination, presumably the basic aim is to create awareness of, and access to, some set of instructional materials. Crucial to the decisions regarding dissemination are considerations of (1) objectives of a dissemination effort, (2) costs to disseminate and (3) utility to the users. There will be at least the following costs to consider regarding specific instructional items.

1. Cost to search and acquire information about the instructional materials.
2. Cost to create and check accuracy of citation.
3. Cost to analyze the instructional material and obtain information about its development, field testing, etc.

4. Cost to evaluate the instructional material.
5. Cost to list and describe the instructional material. (Reports outcome of 2,3, and 4.)
6. Cost to classify or index the instructional material (if a list or catalogue is anticipated).
7. Cost to organize, edit, publish, and distribute the list or catalogue.
8. Cost to user to gain access to the list or catalogue.
9. Cost to user to "use" (search out and interpret what is reported).
10. Cost to user if the listing misleads him in purchasing or using less adequate materials or in not purchasing or using what would have been more adequate materials.

Costs 9 and 10 are generally inversely related to cost 3, 4, and 5 especially, but may also be inversely related to 1, 2, and 6. There is definitely a tradeoff between cost to producer and cost to user. Moreover, there is usually a tradeoff between quantity and quality. As the number of instructional resource items are increased, given a fixed "producer's" budget, the amount and quality of information available on each specific item will usually diminish. Analysis and evaluation, and the acquisition of sufficient information to accomplish either, can be especially costly. For the same budget, one can produce a catalogue that only lists and possibly indexes citations to a very large number of instructional materials, or conversely, provides citation, analysis, and extensive evaluation of a relatively few instructional materials. But which type of catalogue will be more useful?

Several kinds of utility may be worth considering; the primary one usually will be the utility for the user who is searching for instructional materials that can be used in training. The users may be the target groups we have identified in this project as degree trainers and nondegree trainers or the users might even be students themselves, especially if the individuals are looking for self-instructional aids to acquire new skills or upgrade existing skills. Utility for these groups may best be considered in terms of the difference that access to information about instructional materials might make compared to what the groups would do without the information. In other words, would use of a selective dissemination service or an instructional materials catalogue give the trainer or student access to better materials than would otherwise be available without the service? Would it reduce their cost and effort in searching for better materials, or possibly even result in their acquiring and using materials in content areas which otherwise would not be accessible at all? This kind of differences implies marginal utilities which, though hard to measure, are nevertheless meaningful.

There are other types of utilities which may also be important. For instance, the sponsor or developer target groups may be concerned with obtaining a general overview of "what is available" or "the best that is available" in particular areas. They may be interested in whether or not sufficient justification exists to develop particular types of instructional materials, keeping questions of possible redundancy well in mind, and searching for good ideas for formats and methods, etc. In such cases, relatively comprehensive (but hopefully well classified and indexed) listings may be of greater value than smaller but more selective listings, since the more comprehensive listing can represent "sampling frames" from which samples may be drawn for more extensive surveys and analysis. Because these kinds of needs can be so specialized, it is doubtful that any particular format for a catalogue or other listing would be completely satisfying. Obviously, comprehensive and accurate indexing and descriptions would make such a catalogue more useful as a starting point. But the amount of savings in such specialized uses will probably be small. It would probably be of greater importance that the list be well documented, reasonably recent and inexpensive to update.

2. Evaluation Approaches

Too often a particular method of evaluation is selected without due regard for the larger measurement and decision assumptions which it may implicitly entail. So before considering any specific methods or techniques, we shall undertake a broader examination of some of the issues related to the evaluation of sets of instructional materials where the intent is to convey information about them to sponsors or users.

Although many dissemination requirements can be described, there seems to be a smaller number of evaluation approaches. Possibly, the simplest way to group these approaches is by their intent: (1) to select, (2) to classify, (3) to criticize or (4) to estimate worth for particular uses.

Selection appears to be the most fundamental problem since it must be a part of any of the other three approaches. These are some of the factors bearing on selection: (a) the number of items to be considered, (b) the cost of considering each item, (c) the final number to be selected,

(d) the finality of the decision, (e) the risks involved in misassignments and (f) the technical characteristics of test and decision processes available (accuracy, precision, reliability, validity, etc.).

Factors (a) and (b) interact in the practical situation, since the total amount of resources (time, money, patience of judges, etc.) available for selection will be limited. A large number of items to be considered implies a smaller average amount available per item. The final number to be selected is also important. The ratio of (c) and (a) establishes the selection ratio. The selection ratio has an important bearing on the utility of any selection effort (Cronback and Glesser, 1965). Whenever extreme selection ratios are encountered (i.e. when most but not all are to be selected or when only a few of many are to be selected) it almost always pays to employ a sequential selection procedure. In fact, sequential selection is usually employed when only a few of many items are to be selected. It is less often used, but should also be employed, when one is rejecting only a few items.

Sequential selection procedures relate to factor (d), the finality of the decision. An important question to ask is whether the evaluation method calls for an irrevocable commitment to accept or reject or whether the decision can be reviewed later. Typically there are two classes of rejects: those rejected completely, and those rejected for now but held for further consideration. Similarly we often find two classes of accepted items: those accepted without qualifications, and those accepted with qualifications. In some selection situations an entire group of rejects may be eligible for consideration at a later date, but in most cases, a complete reject has no further chance. This would certainly be so for a particular issue of an instructional materials catalogue. By contrast, the ETS selection of products for focused dissemination (Epstein, Margosches, Schrader and Walton, 1971) has given rejects a second chance, and has, in effect, placed products in all four classes described above. Cronback and Glasser (op. cit.,Chapter 6, Appendix 4 and Appendix 5) provide a useful technical discussion of how sequential testing improves the efficiency of the selection process.

Undoubtedly the most important aspect of any selection process is the consideration of the risks involved in misselection, that is, considering the gains and losses attendant on rejecting a "good" or accepting a "defective" one. In the dissemination of instructional materials, this usually is the losses to the user, the distributor, and the developer of failing to list a (rejected) instructional material. The acceptance of a defective item will also represent a loss to someone who acquires and uses it, and will eventually reflect on those who sponsor, develop, or disseminate the catalogue, list, or other media including the instructional materials.

Consideration of selection risks helps focus attention on the "welfare economics" of any educational materials selection problem--the two ways of being in error, the number of times errors occur, and the risks associated with those errors. A comprehensive concept is the "utility" of the selection process itself. The overall utility of the decision process applies to a larger number of elements including at least: the number of instructional materials to be considered, the selection strategies available, the information available, the number of outcome categories, the value of each outcome category the cost of gathering information, and the cost of making and implementing decisions.

If decisions can be empirically validated, then there is ample empirical evidence that "statistically" established weights will almost always prove superior to "clinically" established weights or other decision rules. A severe problem for evaluation of educational products is that adequate statistical validation procedures are virtually nonexistent. We lack accepted criteria, means of measurement, and sufficient quantities of data on a broad enough range of products to even begin to deal with validity. Indeed, we have only the crudest information on reliability. Typically the merit, whether explicit or implicit, is at best ordinal, that is a rank ordering in terms of overall merit. Until greater attention is given to measurement, especially criterion measurement, and to evaluation of utility for those criteria, there will be little or no rigorous technical basis for selection. The validity of nearly every educational product evaluation procedure is assumed. A few studies cite interrater reliability coefficients; but validity coefficients are almost nonexistent.

Lacking this kind of information, most evaluation decisions in the near future can at best adopt a strongly Bayesian perspective in which well-informed *prior* distributions (regarding the distribution of estimated utilities) can at least be subjected to some empirical test, so that more effective *postposterior* distributions can be developed. (Aitchison, 1970; Ferguson, 1967; Raiffa and Schlaifer, 1961; Schmitt, 1969). Currently our approaches, whether analytic or wholistic, remain virtually unexamined and certianly unvalidated.

Classification. The evaluation problems of classification are more complex than those of selection. Basically classification involves the assignment of an object to one of a set of categories. The simplest type of classification problem uses univariate information. For instance, in terms of some overall measure of the worth of instructional materials, they may be classified as: not acceptable, poor, good, excellent. For an instructional materials catalogue, the classes might be the following: do not list, list only, list with description, or list with description and recommendation. (By contrast, selection would involve only the decision to list or not list.) The situation in which there are several types of information that cannot be reduced to a single composite measure is far more difficult. Horst (1954, 1956), Brogden (1951, 1959) and Magwire (1953) have done much to develop the statistical foundations for this type of problem. Unfortunately, these treatments offer little practical help in the absence of information which relates evaluation measures to payoff measures. But they do provide assistance in conceptualizing the problem and in suggesting how one might proceed if adequate data were available.

Criticism. Unlike selection and classification, which involve well-defined decisions leading to relatively precise dispositions, criticism is a much less precise activity. However, it can be reduced to a basic multiple dimension classification model in that the critic analyzes an instructional material, identifies its salient attributes, and then evaluates the strengths and weaknesses or otherwise the worth of those attributes. Usually an overall appraisal of worth for one or more implicit or explicit uses is also attempted. Certainly few critics would recognize or agree that their efforts reduce to a classification problem, but we believe this is the case.

We are concerned basically with criticism applied to a set of products, not a single product. The problem is usually not to criticize a single product from a particular perspective, perhaps regarding a very specific use; but rather to criticize each of a number of alternative products from a more general perspective.

A significant quandary for critics and those selecting or classifying is the determination of how well-defined and how valid are the critic's requirements. Most criticism is based on assumptions that criteria such as authenticity, appropriateness, scope, interest, technical characteristics, etc. will be related to decisions of worth or utility. In most cases these attributes appear to be quite logical and enduring.

An interesting problem is how does the decision maker--whether another person acting on the critic's information, or the critic himself--arrive at an overall judgment? Sometimes, the critic leaves this problem to another person by reporting sufficiently on his analysis and evaluation, to permit another person to make his own decision. Indeed, given the variety of settings, conditions, and special requirements which different users may encounter, well-documented, evaluated criticism, will usually be preferred over a precisely stated, but less informative overall grade or set of scores or symbols.

Evaluation of worth for particular uses. Ultimately, decisions regarding a limited set of alternatives with regard to highly specific situations will be made by the decision maker(s). With respect to educational RDD&E instructional materials, these decisions typically will be made by a single trainer or a student. The basic aim of a rational (rather than promotional) dissemination effort will be to assist the user in acquiring needed information, bearing on the user's own requirements, regarding all reasonable alternatives. Perhaps the aim will also be to assist the user in developing a frame of reference for evaluating the alternatives, and to make useful comparisons among them. To do this, one has to anticipate a user's requirements and of how the user processes information regarding alternatives. The applied research performed at the Far West Laboratory in developing the ALERT system suggests that ways must be found to help the user to quickly narrow a large set of alternatives down to a relatively small number (say five to seven), and to quickly review major characteristics regarding content, method, level of difficulty, rationale, cost, etc., to focus on two or three most promising alternatives. However, once this stage is reached, the user typically wants much more information than can usually be supplied in any one report. He also usually does not want much of the information which is often provided. Practical comments about pluses and minuses derived in actual applications, comparisons with popular, well-known alternatives, and practical critiques by users are usually more valued than highly technical field-test data, or analyses of characteristics that do not relate to the user's decision problems. The most valuable information is that which best helps the user to differentiate between alternatives (which may be of almost similar overall merit) in a way that permits the user to select the one with the greatest utility for his specific need.

Evaluation procedures that attempt to maximize differences with respect to general assumptions about users' needs may in fact have little value in aiding the user in making such differentiations. This relates to an issue often ignored in evaluating alternative educational products: much more attention must be given to determining what information will best help users to make choices among good alternatives if a rational dissemination strategy is desired. Attention too often is focused on arriving at a good overall evaluation that at least correctly rank orders alternatives. This is sufficient only when gross selection, say for entry in a catalogue or for general promotion, is the aim.

This implies a possibly important conclusion; namely, that user-oriented evaluation of instructional materials must be sequential and that different evaluation strategies are indicated at the different stages. At the first stage, for the purposes of general selection, evaluations based on overall merit assuming some general set of user needs seems to be the indicated strategy. At a second stage, for the purposes of classification (say in identifying which materials would work best for specific applications), the amount and kind of evaluation information provided needs to be considered in terms of how it will provide the average user (or specified subclasses of users) with information having greater utility for cost than the user would normally obtain.

As one begins criticism or evaluation designed to assist users in specific decision situations, information concerning overall merit, or even characteristics that only generally differentiate among alternatives, will usually not be as useful as information relating to selecting the best instructional material for specific uses. In sum, greater attention must be given to differences in uses than to differences of the materials themselves.* For a general idea of what information users want, consult "Needed: Exportable Models of Significant Change in Education" (Ohme, 1972); although the article deals with educational practice models and is hardly definitive, it is useful.

3. Practical Recommendations

Given the above discussion of issues, what practical recommendations can be made? Since specific recommendations can be given only when purposes, objectives, resources and constraints are well-defined, we doubt there can be any one best evaluation procedure.

In cases where the selection ratio is extreme, either in the sense of selecting or rejecting almost all, then a sequential (two-stage or multistage) selection method should be employed. When the selection ratio is not extreme, for example when something like half of the candidates will be selected, then a one-stage, accept or reject method may be nearly as effective. In the case of extreme selection ratio cases, we believe that the methods developed by ETS (with the assistance of EPIE) are the most promising and well worked out (Epstein, Margosches, Schrader and Walton, 1971; Walton, et. al., 1973). The purpose of the ETS effort was to identify from a large product pool a relatively small group of educational products whose widespread dissemination and use would offer favorable odds for significant improvement in the quality of education. Basically, the approach consists of collection, classification, and organization of information on products, which is then reviewed by a panel of experts. This information is organized in a dossier that includes a carefully written précis of the information deemed most important to the panel's evaluation needs. Because of the importance of conveying accurate and adequate information, these précis should be sent to the product development principal investigators for their review and comment. The précis is the key document used in panel consideration although panelists could resort to the complete dossier. The panelists review the précis according to a set of criteria that have been cogently summarized on a single rating form. Major criteria are goals, evidence of effectiveness, costs, and adoptability. Panelists are permitted to arrive at their final overall rating in any way they chose. Special procedures are used to overcome well-known biasing effects resulting from the order in which products are examined. After initial independent ratings, the full panel meets to discuss and rerate products for a semifinal rating. Products receiving high total ratings are listed on a blackboard in overall rank order based on the sum of individual overall ratings. A tentative cutting score is agreed upon, and following further discussion of products in the vicinity of this score, some adjustments are made in ratings of products near the threshold. At this point a final set of ratings and a firm decision regarding the cutting score is made. The 1971 ETS report notes that the use of a rating scale formulated in terms of the action to be taken by the panel and the use of a numerical method for combining ratings from different raters worked very well and appears to have facilitated the setting of a standard for acceptance (Epstein, et al., 1971, p. 53).

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* Lately, educational research has been concerned with aptitude-treatment interactions, based on the assumption that the same treatment may not be best for subjects with different aptitudes. If we consider instructional materials as "treatments" and translate "aptitude" to mean the entire set of significant user conditions, there is a clear parallel. What this aptitude-treatment interaction research also suggests is that although the theory is good, obtaining useful empirical data to guide practical decisions will be quite difficult.

The ETS method is expensive. Where large numbers of products are involved, one or more stages of prescreening by possibly just a pair of competent judges might be used to reduce the number of candidates to manageable size for consideration by a panel. As noted previously, there is no reason why a similar procedure would not work well when the need is to reject a few candidates. Such a procedure might be appropriate where severe criticism could be anticipated regarding the justification for elimination of some instructional materials.

When selection ratios are not extreme, the ETS method is not recommended primarily because it is far too costly; and a much less expensive process is needed. Unfortunately, we know of no really practical methods. The ETS method, as well as other analytical methods, depend heavily on the quality of product information available. As investigators at ETS (Walton, et al., 1973), AIR (Dunn, et al., 1973), and the Far West Laboratory (1972) have learned, obtaining this information can be most difficult, time-consuming and expensive. The "PARADE" form (Dunn, et al., 1973) evaluates a small number of products developed initially under USOE, NCERD sponsorship, but hardly covers more than a small fraction of conceivably eligible instructional materials. The PARADE form is only an identification and classification aid and is not adequate by itself, a fact acknowledged by its senior author (personal communication with Dr. James Dunn).

This situation seems to leave the choice of evaluation method between depending on making judgments about the product itself or depending on the product plus whatever information can be obtained from developers, distributors or users. If the product alone is used, several analytical schemes at least suggest how one might proceed. The models by Easley, Jenkins, and Ashenfelter (1967), Stevens and Morrisset (1968), Eash (1969, 1970) and Walberg et al. (1962) are described and evaluated in the evaluation report. We concluded that, of the various content analysis approaches, Eash's seems to be the most promising for accomplishing rough screening and perhaps classification of instructional materials. Its chief virtues are its focus on estimated effectiveness rather than simple analysis and its deliberate intent to serve as a practical instrument of manageable length and complexity.

The Eash assessment instrument can be employed when only the instructional material is in hand. The Stevens and Morrissett Curriculum Analysis System (and its Far West Laboratory derivative) usually require additional information. The Eash assessment instrument requires much less time to complete than the Curriculum Analysis System, which, in turn, is usually less time consuming than the Easley, Jenkins, and Ashenfelter scheme for analysis of many assignable units within an instructional package. The Eash assessment instrument does deal with the goals and effectiveness (and overall rating) rubrics of the ETS rating form. It does not deal directly with the costs and adoptability rubrics. These two elements should, and probably can be, easily added.

We believe that a selection instrument derived from the Eash assessment instrument but modified to consider "costs" and "adoptability" would be useful as an intermediate screening device when a large number of materials are to be considered and when the selection ratio is not extreme. Prior screening with a less expensive device seems warranted.

A three-stage process would probably be most economical. The first stage would be collecting copies of all candidate instructional materials, grouping them by categories, and then preliminary screening of candidates within each category to eliminate obviously obsolete, erroneous, poor, weak, stereotyped, or redundant items. For this purpose, the Easley, Jenkins, and Ashenfelter criteria are recommended.

At the second stage, an "Eash-like" assessment instrument, modified to include cost and adoptability criteria, should be employed for classifying surviving instructional materials into three classes: (a) accepted, (b) rejected and (c) held for further evaluation.* At least two trained judges should independently assess each product. When they cannot agree on the classification of a product, it should be placed in the hold category. A second round of assessment, this time employing a new set of judges, should then be undertaken to reclassify all products placed in the hold category; however, all three classifications would still be allowed at this stage.

At the final stage, a third set of judges would be employed. Their first task would be to make a blind reassessment exclusively of random samples of accepted and rejected instructional materials. The judges would be required to accept or reject all items. This step is desirable as a check on the interjudge reliability of the screening process. If satisfactory agreement is not reached, the entire effort would have to be repeated, presumably after further training of judges or reworking of the procedures or both. The final step for the third phase would be to dispose of the remaining materials still in the hold category by accepting or rejecting them.

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*If the assessment process entails considerable cost or risk, further development and pilot testing of instruments and procedures is strongly indicated.

The assessment protocols developed by the Eash selection instrument can be used as a basis for preparing annotations on all accepted entries. As with the ETS précis, we recommended that developers be permitted to review and comment on these annotations before they are edited and finally published. (See Walton, et al., 1973).

Summary. In the preceding section we have recommended two different methods of evaluation, depending on whether the intent is to select (or reject) only a few of a large set of candidate materials or to select some intermediate proportion (e.g., between 20 percent and 80 percent). The focus has been primarily upon selection; however, both recommended procedures create documentation that can be used as a basis for "classification" or "criticism." If more extensive analysis is desired, the Curriculum Analysis System is recommended. We prefer the Far West Laboratory version which has been subjected to several years of development and field test. These procedures have been documented in three items (unpublished, but obtainable from the Far West Laboratory): (a) Curriculum Analysis Team Instructional Manual, (b) The ALERT Mini-Notebook: A Guide for Gathering Information for Cards and Summaries, and (c) ALERT Information System Writer's Manual.

Unfortunately, none of the recommended procedures (whether ETS's for extreme selection ratios or the Curriculum Analysis System for intensive criticism and evaluation) provides a substitute for experienced judges who will usually have to make evaluations with little or no field test data. Adequate field test data is simply not available for more than a very small portion of instructional materials in educational RDD&E. Hence the rigorous evaluations based on such data (Stake, 1967; Epstein, et al., 1971; Walton, et. al., 1973; Scriven, 1973) cannot be applied uniformly and, in fact, will be applicable only in relatively rare instances. In most cases, performance effectiveness will have to be inferred. If this must be done, then Eash has at least given us a start by stating relevant criteria.

A completely feasible and not too expensive next step would be to compile a set of instructional materials for which there is reasonably adequate field test evidence, and then to determine whether judges (who are unacquainted with the field test results) can make valid performance inferences based only on their examination of the instructional materials. If we must depend primarily on judgment , we could at least attempt to validate the judgment process.

In closing, we must emphasize that there is no one set of criteria that can be applied optimally to all instructional materials evaluation situations. Ideally, one searches for relevant, cost-effective, attractive usable materials. Credible performance-effectiveness data based on comparable populations and comparable use conditions is highly desirable. In reality the information pertaining to such ideal criteria is quite limited and imperfect. To paraphase a quotation, the assessment of educational (RDD&E) instructional materials is the art of arriving at sufficient conclusions from insufficient data. The basis of this art is not a list of criteria, nor even perhaps a set of rating scales. Rather it is in the development of an explicit and sufficient statement of purpose and objectives; in defining as precisely as possible the decision situation(s) which classes of users may encounter vis à vis defined sets of instructional materials; and then in relating available (or obtainable) information about instructional materials to anticipated outcomes in these situations. This is an extremely complex process--so much so that some expert judges who attempt it, find it difficult to explain. It is primarily an art. In the absence of systematic efforts to analyze and validate the process, it will remain an art. Procedural methods, dossiers, précis, checklists, rating forms, and the like may make the art more reproducible and possibly more efficient. But effectiveness criteria call for a massive inferential leap, from whatever is known or can be observed of the instructional material, to some set or sets of applications, and costs, and user's values (utilities) for those outcomes and costs.

We have eschewed defining a particular evaluation process. But we have analyzed the general evaluation problem and made recommendations on evaluation procedure. What we most strongly urge is that any selected process be treated as itself a development task, which should be subjected to test, evaluation, and revision. If at all possible, the test data should attempt to assess, (no matter how crudely) product utility for target audiences. Until this effort is made, our evaluations of instructional materials will remain primarily guesswork. If it must be guesswork, NIE is advised to use judges who have extensive relevant experience in the actual use of instructional materials, preferably with populations of subjects, conditions, and content similar to those pertinent to RDD&E training.

VII SUMMARY

A. Graphic Summary

The data presented in Chapters II, III, IV and V can be organized in terms of the following questions:

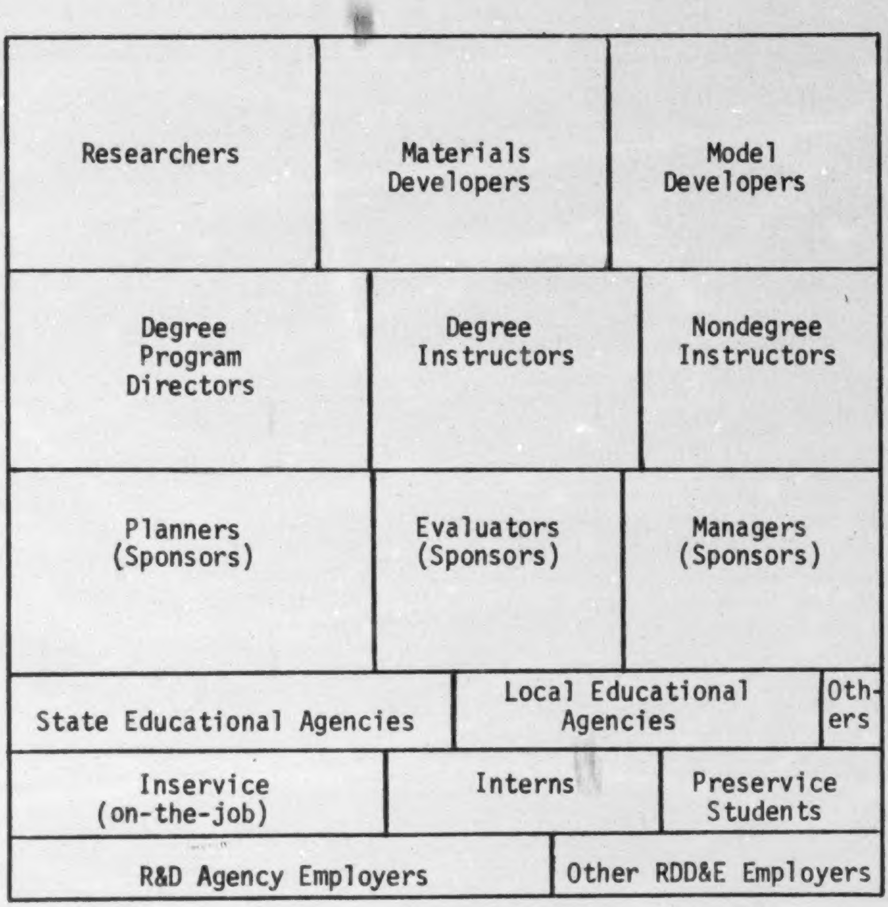
1. Which users should be served?
2. What are the purposes for which users seek information?
3. What information content do users want?
4. What quantity of RDD&E literature is relevant to their information content needs?
5. What quantity of instructional materials is available?
6. Which proposed products and services are most valued?

The figures on the following pages provide graphic summaries of key data relating to each of the above questions. The areas in each figure are proportional to overall weighted averages of priority points reported in data tables in Chapters II, III, and IV or percentages of counts reported in tables in Chapter V.

1. Which users should be served?

FIGURE 1

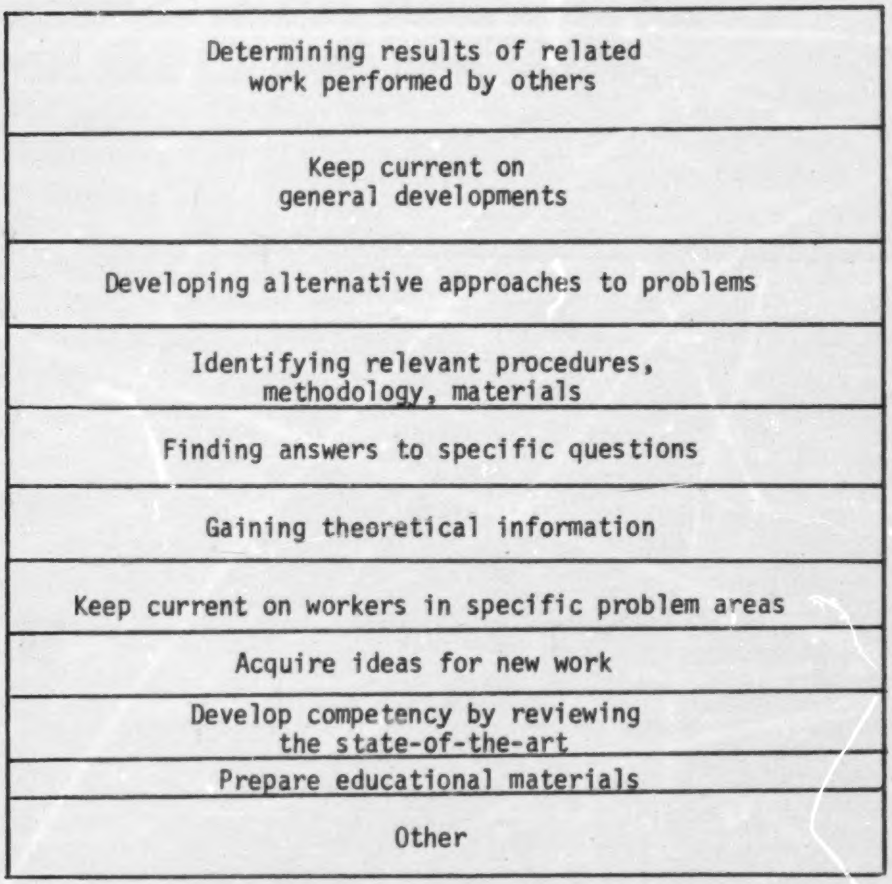
RELATIVE PRIORITIES OF
TARGET AUDIENCES


Researchers
Materials Developers
Model Developers
Degree Program Directors
Degree Instructors
Nondegree Instructors
Planners (Sponsors)
Evaluators (Sponsors)
Managers (Sponsors)
State Educational Agencies
Local Educational Agencies
Others
Inservice (on-the-job)
Interns
Preservice Students
R&D Agency Employers
Other RDD&E Employers

2. What are the purposes for which users seek information?

FIGURE 2

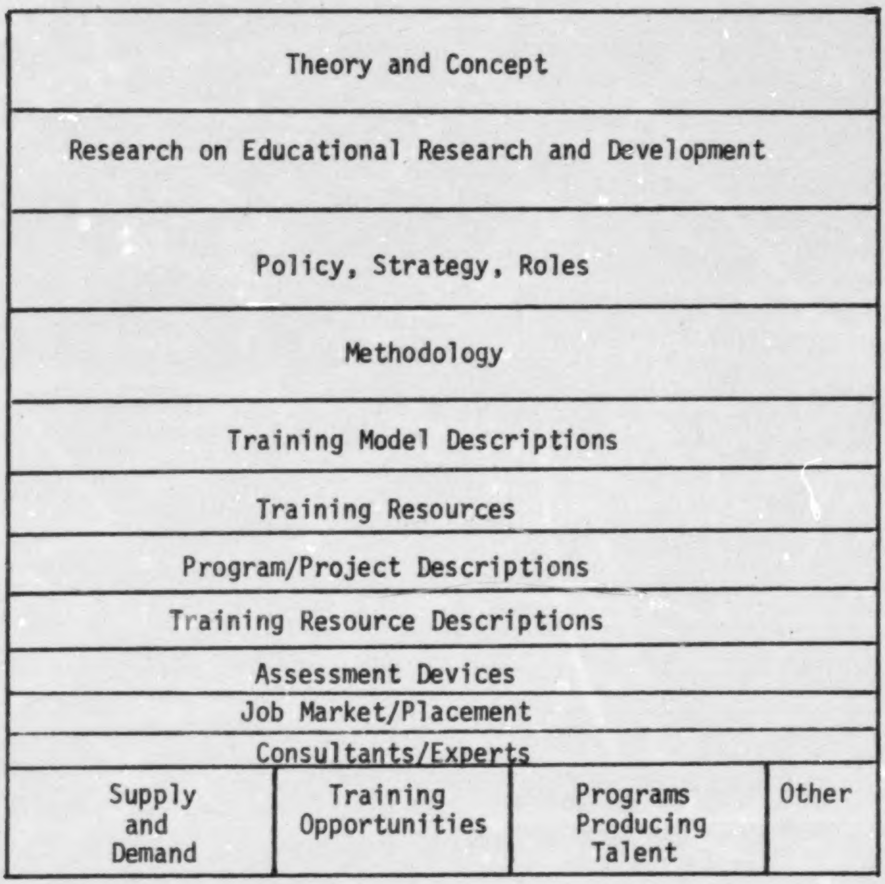
RELATIVE PRIORITIES OF
PURPOSES FOR SEEKING INFORMATION


Determining results of related work performed by others
Keep current on general developments
Developing alternative approaches to problems
Identifying relevant procedures, methodology, materials
Finding answers to specific questions
Gaining theoretical information
Keep current on workers in specific problem areas
Acquire ideas for new work
Develop competency by reviewing the state-of-the-art
Prepare educational materials
Other

3. What information content do users want?

FIGURE 3

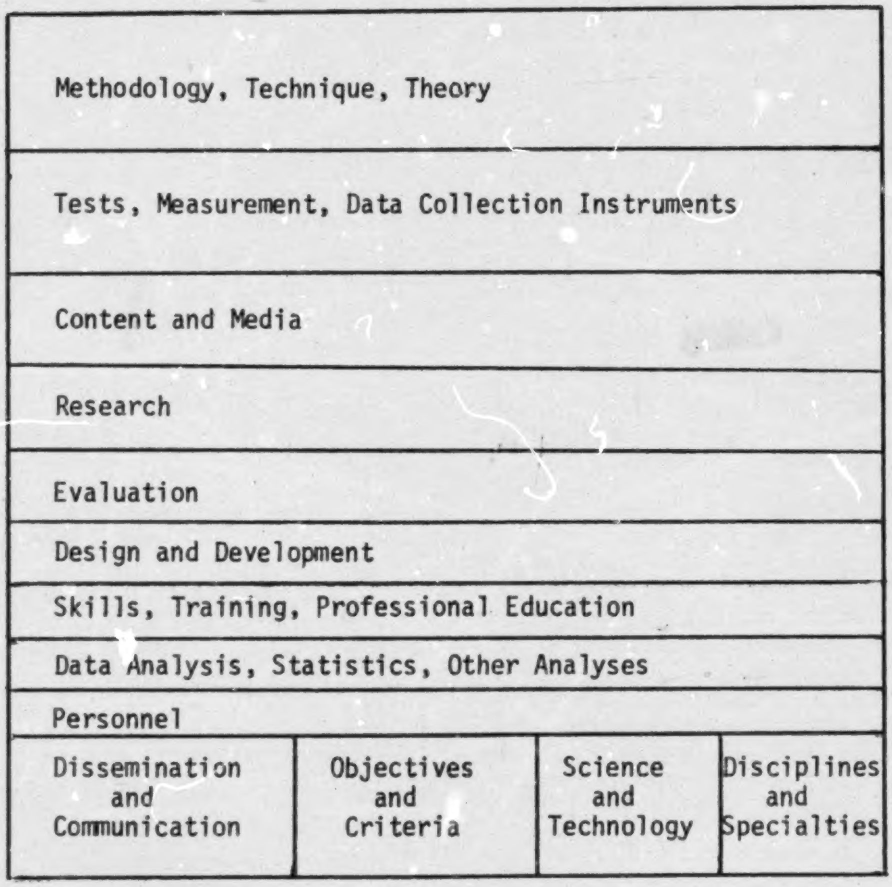
RELATIVE PRIORITIES FOR INFORMATION CONTENT


Theory and Concept
Research on Educational Research and Development
Policy, Strategy, Roles
Methodology
Training Model Descriptions
Training Resources
Program/Project Descriptions
Training Resource Descriptions
Assessment Devices
Job Market/Placement
Consultants/Experts
Supply and Demand
Training Opportunities
Programs Producing Talent
Other

4. What quantity of RDD&E literature is available relevant to their information content needs?

FIGURE 4

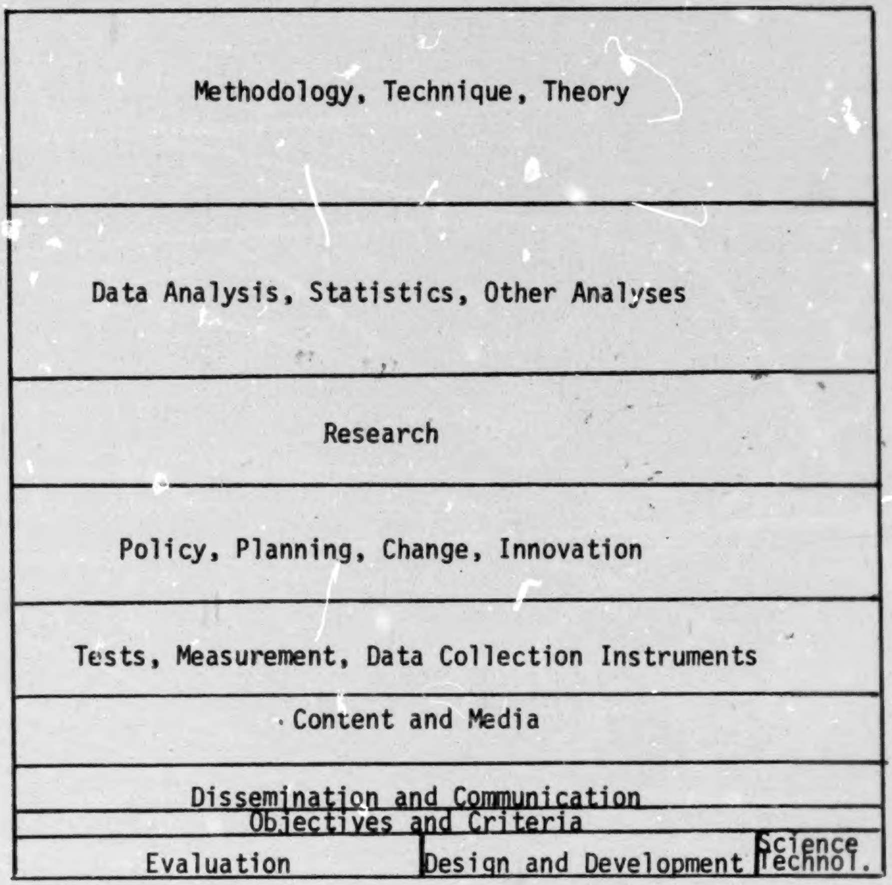
ESTIMATED RELATIVE QUANTITIES OF LITERATURE BY CONTENT CATEGORIES BASED ON ERIC COUNTS



5. What quantity of instructional materials is available?

FIGURE 5

ESTIMATED RELATIVE QUANTITIES OF BOOKS AND OTHER INSTRUCTIONAL MATERIALS BY CONTENT CATEGORIES



6. Which proposed products and services are most valued?

FIGURE 6

RELATIVE PREFERENCES FOR ALTERNATIVE
INFORMATION PRODUCTS AND SERVICES

Publish a newsletter
Publish an annotated listing of current literature
Publish a sourcebook of selected literature
Publish an instructional materials catalog
Operate a hot-line providing quick response to inquiries
Answer mail inquiries
Publish a sourcebook of selected case studies
Support conferences and meetings
Provide a center to visit and consult.
Publish mini-collection
Provide grantees with a tailored "grant package"
Provide technical advice on "marketing," and publication
Publish a directory of training opportunities
Publish a directory and sponsor telephone conferences

B. Conclusion

The major challenge for this project was to study and to identify feasible, alternative solutions to user information requirements. Although the focus of the project was on "personnel and training," we believe that our findings have broader implications for the entire field of educational RDD&E.

Our study started with certain assumptions derived from research into the behavior and information-using habits of scientists and engineers, from several years of experience in the development and field evaluation of educational R&D information systems, and from personal experience with the problems of obtaining information regarding educational RDD&E personnel supply and demand, training programs, and materials and resources. This experience had prepared us to anticipate a poorly organized and highly inefficient knowledge transfer network.

The studies of scientific information exchange in education by Nelson, Garvey, and Lin (1970) and Nelson (1972) have confirmed this impression. The educational "research" information network is indeed poorly structured and the typical educational researcher, as an information consumer, greatly lacks awareness of current activity. Our own study indicates that the problems for educational developers and diffusion personnel are even more serious. First, they are probably much less print-oriented than their discipline-oriented research colleagues. Secondly, the nature of their work typically requires reference to information in several fields. Finally, much of the information they seek (methods, techniques, procedures) is either not published at all, is given very limited distribution, or is not effectively indexed or easily retrieved from available information systems. The problems faced by federal sponsors appear to be much like those of the developers, except that the time pressures on the sponsors are often greater and the needs for comprehensive, "decision-oriented" information is even more severe.

Trainers were once in a more enviable position when only traditional research was the name of the game and the supply and demand situation was stable. But as demands increased for talent trained in DD&E and for personnel who could accomplish problem-solving disciplined inquiry in culturally and socially charged situations, training programs have responded slowly. Trainers who are aware of these changes report the need for, but difficulty in obtaining, relevant information and instructional resources. Employers are concerned to find persons trained to perform effectively in applied research, development, diffusion, evaluation, and R&D policy and management positions. They also require training resources to upgrade these skills in their staffs.

Most of these educational RDD&E personnel must choose between reliance on informal communication, which may not extend much beyond the work team or a highly "disorganized" invisible college, and reliance on formal communication channels and media, which deliver information years late and are heavily "research" biased in both content and the effectiveness of their retrieval of information.

This rather dismal picture implies that RDD&E personnel in general, and more specifically those concerned with the R&D "infrastructure" (knowledge transfer, personnel capabilities, training capacities) may encounter great difficulty in meeting their needs for information.

We began with the belief that if the actual problems of transfer and utilization of information are to be solved, a complex of networks must be established and supported by appropriate services and hard-copy products that would guide potential target users in their inquiries and provide relevant information in acceptable, usable, inexpensive forms that will foster appropriate and repeated use. Our field test experiences generally confirm the validity of this belief.

But we learned that the "research training" audience is probably too small and certainly too "information apathetic" to justify the creation of a special information center solely dedicated to serving their needs. Yet it was clear that, with the possible exception of the researcher, nearly everyone--sponsors, performers, trainers, and employers--suffers formal structural and functional inability to generate, transfer, and utilize information and instructional resources more efficiently. The problem is not one that can be solved by information technology alone. We must look as well to the norms and values of our educational scientific and technical community, to the rewards and sanctions provided by sponsors, membership groups, and reference groups, and to the relevance of current educational RDD&E training and continuing education.

We must understand that information transfer regarding personnel and training issues in educational RDD&E is "problem-oriented," that the larger areas of educational RDD&E itself are "field-oriented" and that the science which supports that effort is "discipline-oriented" (Hood, McCutchan, Aldrich and Wolf, 1972). Paisley (1971) notes that the source of the knowledge base of each "orientation" has different implications for the most effective organization of information functions and for the modes of communication. Designs for educational RDD&E information systems have suffered from confusing the discipline-oriented information systems of the sciences with field-oriented information systems required by education. We suspect similar errors will be made in confusing problem-oriented information systems with field-oriented information syst

There seems to be little danger that NIE will make such mistakes soon, primarily because its staff are still sorting out what they have inherited from the Office of Education and from other agencies and are attempting to develop a more attractive set of R&D options and a more defensible rationale for future

R&D investments. Given the cutbacks in total federal R&D funding, a projected oversupply of scientific talent, severe retrenchment in federal support for scientific training, and valid reservations about the effectiveness of at least some educational R&D training strategies, there may be no immediate, compelling need to support the specific requirements of the users that have been documented in this report. The recommendations made in Chapter III regarding promising dissemination alternatives are all quite modest. This was deliberate, because we did not believe that more costly efforts could be justified, given the present situation. There is a valid need, but not a strong demand. The later must be cultivated.

It would be a grave mistake, however, not to recognize the need and the opportunity for improvement in the communication of information, with regard not only to the relatively exotic area of "RDD&E personnel and training," but many problem-oriented areas which NIE now addresses. This study has not found a solution, but hopefully it may help to define the problem and to point to some possible first steps.

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APPENDICIES

APPENDIX A

LIST OF PROJECT REPORTS AND PRODUCTS

Reports

Design of a Personnel and Training Information System for Educational R&D Personnel:

1. - Report of the Planning Phase, Paul D. Hood, Nancy A. McCutchan, Charles L. Aldrich, and William C. Wolf, Jr., September 1972.

2. - Report of the Preliminary Design Phase, Paul D. Hood and Nancy A. McCutchan, December 1972.

3. - The Domain of R&D Training Resources, Paul D. Hood, August 1973.

4. - Final Report, Paul D. Hood and Nancy A. McCutchan, August 1973.

5. - Evaluation of Instructional Materials for Educational RDD&E Content Areas, Paul D. Hood, July 1973.

Project Products

Design of a Personnel and Training Information System for Educational R&D Personnel:

1. - Educational RDD&E Personnel and Training Abstracts, Nancy A. McCutchan, Carol Burkhart, and Paul D. Hood, August 1973.

2. - Recommended Journals and References, Frank W. Mattas, August 1973.

3. - Recommended Books and Monographs, Paul D. Hood, August 1973.

4. - Personnel and Training Newsletter, Nancy A. McCutchan, ed. Three issues: vol. 1, no. 1, November 1972; no. 2, December 1972; no. 3, April 1973.

5. - Personnel and Training Abstracts, Nancy A. McCutchan, ed., no. 1, November 1972.

6. - Catalogue of Educational RDD&E Instructional Materials, February 1973.

7. - A Source Book of Educational RDD&E Literature (Sample), N.D.

8. - A Source Book of Educational RDD&E Case Studies (Sample), N.D.

Technical Papers and Draft Reports

1. Creation of "Cost-Preference" Materials, March 1973.

2. User Study, March 1973

3. The Domain of R&D Training Resources, April 1973.

4. Promising Alternatives for the Dissemination of Educational RDD&E Personnel and Training Information, April 1973.

APPENDIX B.

PRIORITIES FOR PRODUCTS AND SERVICES

PRIORITY FOR PRODUCTS AND SERVICES

	Products and Services	Sponsors	Researchers	Developers	Degree Trainers	Nondegree Trainers	Overall Weighted
1.	Publish a newsletter (announcements, articles, descriptions of reports, case studies, instructional resources)						
2.	Publish an annotated listing of current literature	14.68	12.00	17.71	7.63	7.50	12.15
3.	Operate a hot-line providing quick response to your inquiries	8.88	8.00	5.71	11.00	6.63	8.20
4.	Answer your mail inquires	6.68	5.00	6.14	11.50	7.75	7.39
5.	Provide a center which you could visit and consult with knowledgeable technical personnel, and an information and instructional materials collection which you could search	8.90	5.00	5.57	3.38	5.63	5.76
6.	Support conferences and meetings	2.98	9.25	4.57	5.25	7.50	5.78
7.	Publish a telephone directory of volunteer consultants and sponsor telephone conferences	4.63	1.25	3.71	2.00	5.13	3.08
8.	Provide technical advice on "marketing," copyrights, and publication of instructional materials	3.48	4.25	4.14	4.50	4.88	4.19
9.	Publish an instructional materials catalog	11.70	6.25	11.43	6.50	9.38	9.02
10.	Provide grantees with a tailored "grant package"	3.88	2.50	4.57	7.63	1.88	4.23
11.	Publish a "core" mini-collection of the "best in ERIC and NTIS" (hardcopy of indexes and abstracts, plus microfiche)	0.95	7.00	3.29	6.88	5.00	4.57
12.	Publish a source book of selected case studies	7.90	5.00	5.14	8.13	9.38	6.99
13.	Publish a source book of selected literature	14.43	13.75	4.29	9.38	8.75	10.41
14.	Publish a directory of training opportunities	8.20	3.25	2.86	2.00	4.13	4.18
	Total	100.00	100.00	99.99	100.03	100.04	100.00
	Sample Size	N=4	N=4	N=7	N=8	N=8	N=31
	Usable Response %	80%	80%	78%	89%	89%	84%